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U.S. ARMY AIR CORPS

NEWS LETTER

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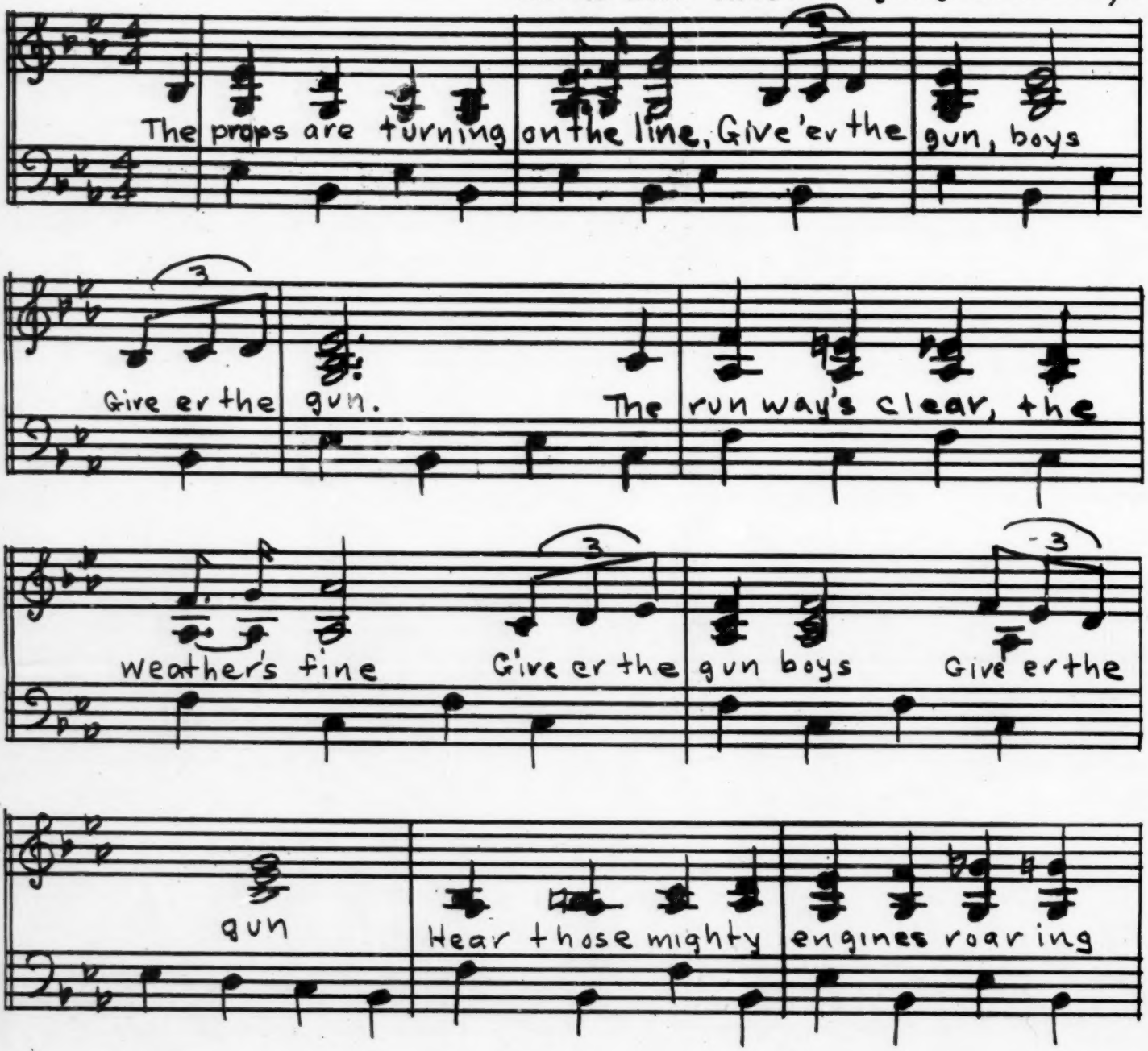
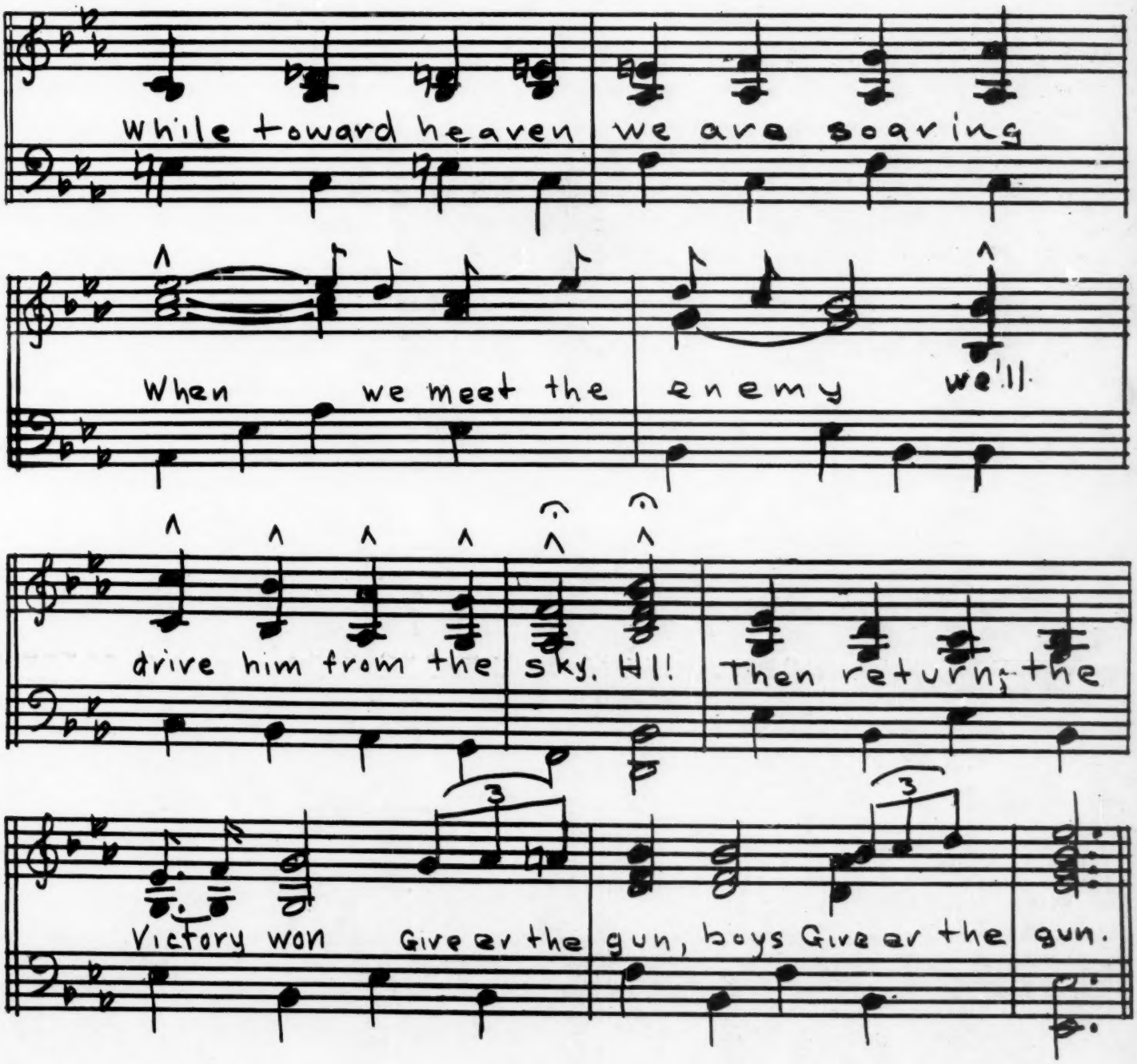
GIVE 'ER THE GUN.

Words and music by Maj C. Blober, A.C

The props are turning on the line, Give 'er the gun, boys
Give er the gun.
The run way's clear, the
weather's fine
Give er the
gun boys
Give er the
gun
Hear those mighty engines roar ing

2.

The bombs hang in their shackles tight,
Give 'er the gun, boys, give 'er the gun.
We've all had practice with the sight,
Give 'er the gun, boys, give 'er the gun.
Engines warmed and crew all ready
On our course we'll hold 'er steady
And upon the target rain
Destruction from the sky, HI:
Then return, our duty done,
Give 'er the gun, boys, give 'er the gun.

3.

The aerial camera lens is clean,
Give 'er the gun, boys, give 'er the gun.
There's film in each magazine,
Give 'er the gun, boys, give 'er the gun.
Pyrotechnic signals burning,
Radio the ether churning,
Giving all the dope to Corps
To help it win the fray, HEH.
Snap a shot while still there's sun
Give 'er the gun, boys, give 'er the gun.

while toward heaven we are soaring
When we meet the enemy we'll
drive him from the sky. Hl! Then return; the
Victory won Give er the gun, boys Give er the gun.

4.

Or will troubles all around,
un. Give 'er the gun, boys, give 'er the gun.
If fog is right down on the ground,
un. Give 'er the gun, boys, give 'er the gun.
Rise above the things that bind us;
Let our country always find us
Up, and flying on our way
If skies are blue or grey, HEH:
Never quit till duty's done,
un. Give 'er the gun, boys, give 'er the gun.

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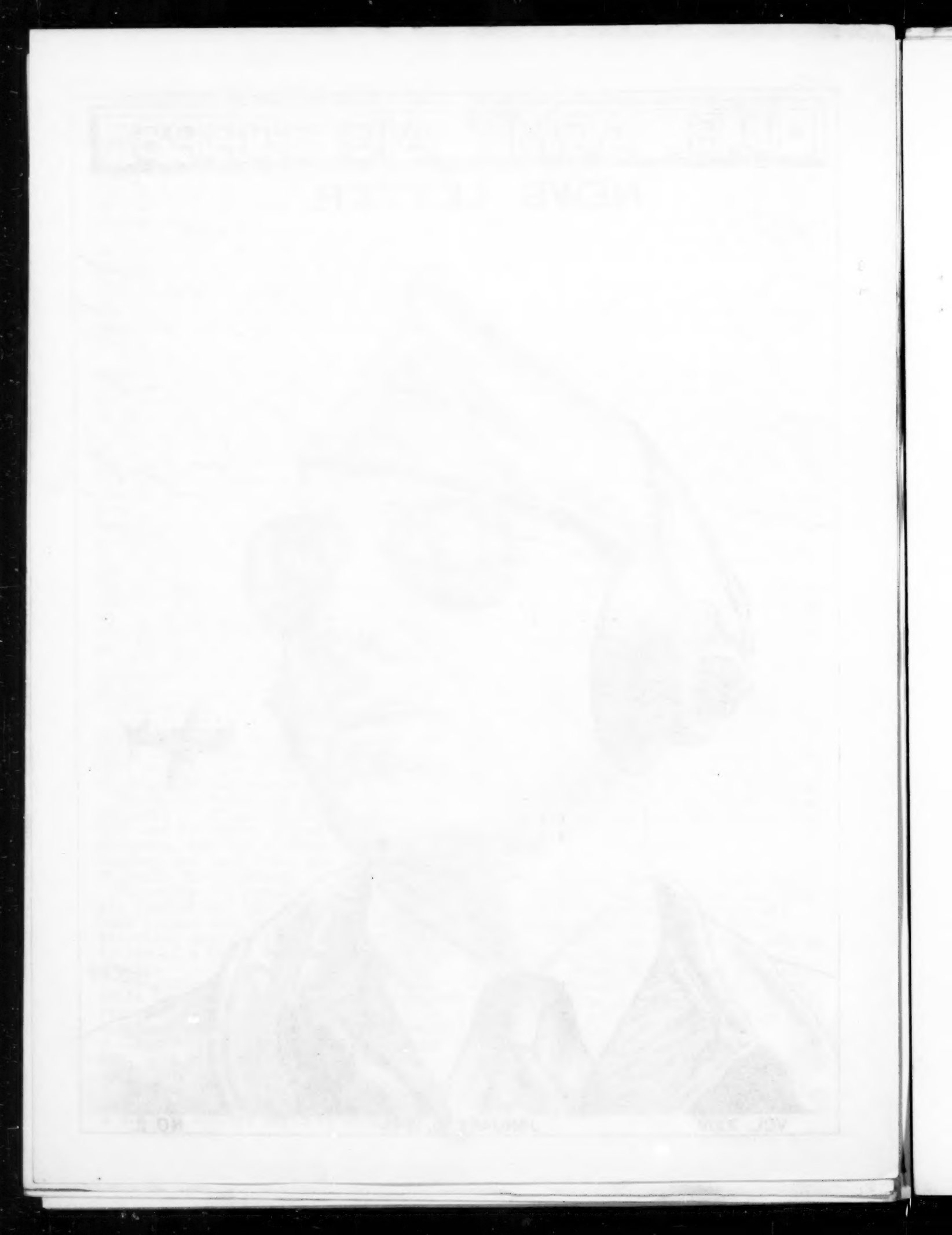

VOL. XXIV AIR CORPS NEWS LETTER NO. 2.

Intelligence Division
Air Corps

January 15, 1941

Munitions Building
Washington, D.C.

The chief purpose of this publication is to distribute information on aeronautics to the flying personnel in the Regular Army, Reserve Corps, National Guard, and others connected with aviation.

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WRIGHT FIELD ACTIVITIES FOR CALENDAR YEAR 1940

Defense efforts of the Materiel Division, which is responsible for the development, procurement, issue and maintenance of airplanes and equipment for the Army Air Corps, included as a foremost accomplishment in 1940 the completion of contract negotiations for practically all airplanes included in the Air Corps Expansion Program.

Procurement

Air Corps purchases made by the Contract Section for the first eleven months of the Calendar Year 1940 total $1,629,231,331, an amount greatly exceeding the combined purchases made in the last several years. Anticipating the greatly expanded purchases, the Section laid ground work in advance by conferring with manufacturers, determining their ability to supply articles desired within the delivery dates specified, so that orders could be placed as soon as funds were appropriated.

One of the most important tasks was to set up methods of financing new plants required for the additional orders. Four alternate plans set up are:

1. Plant facilities are constructed and paid for by the government through the Quartermaster General's Department and leased to the manufacturer.
2. The manufacturer builds and equips plant according to government-approved plan and is reimbursed in 60 monthly installments, after which the government has title to the plant. The manufacturer may buy the plant from the government.
3. The manufacturer finances the plant and is authorized to amortize the cost by five annual installments deductible from his gross income, thereby saving the normal and excess profits taxes on the portion of his income required for this amortization.
4. The manufacturer rents a plant which the government, through the Defense Plant Corporation, has constructed and equipped, financing it with a loan from the Reconstruction Finance Corporation.

Production Engineering

A program has been put into effect to modernize and simplify aircraft design in order to improve performance and suitability characteristics of tactical types of airplanes. In this connection, armor plate protection has been provided, leak-proof fuel tanks and fuel systems have been developed, additional guns with larger calibers and increased firing rapidity have been installed, and power turrets have been adopted for Bombardment type airplanes. In addition, much progress has been made in rendering high altitude flying more feasible. This has been accomplished through utilization of improved fuel systems with booster pumps attached, special superchargers, lighter and more efficient oxygen masks, and newly developed low-pressure oxygen tanks in which the danger of explosion during actual combat has been materially lessened.

Standardization of Army and Navy specifications and equipment has been accomplished through the preparation and promulgation of single specifications, usable by both services without modification. Additional progress is being made which will further tend to standardize all Army-Navy procurement and inspection activities.

In order to expedite delivery of aircraft accessories and components, there is being established a special branch to allocate materials and equipment to the proper manufacturers in order to prevent delays in aircraft production.

Production control plans are also under way to place a representative of the Production Engineering Section in each manufacturing plant filling government contracts on a cost-plus-fixed-fee basis. These representatives will maintain records of all machinery, materials, and equipment purchased by the contractor under the five-year amortization plan, in order to certify that financial provisions of the agreement between the government and the contractor are being satisfactorily adhered to.

Another 1940 development in production engineering has been the inauguration of cooperative measures between the automotive industry and Air Corps procurement agencies. In this connec-

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tion, an exhibit of Air Corps articles has been set up in Detroit under the joint direction of the Air Corps, the National Defense Commission, and the Automotive Manufacturing Association. This exhibit has been prepared for the purpose of acquainting the industry with governmental needs, and of interesting manufacturers in national defense contracts. Firms desiring to manufacture articles on exhibit are investigated by the National Defense Commission and, if qualified, are awarded Air Corps contracts.

Industrial Planning

Process engineering of 35 expansion projects devoted to the production of airplane, engine, propeller, and Government Furnished Equipment, was accomplished by the Industrial Planning Section. Raw material requirements were tabulated for the Office of the Secretary of War, and requests for allocations of productive capacity were forwarded to the Advisory Committee to the Council of National Defense.

Inspection

Organization and development of plant protection for airplane manufacturers came with the establishment of a special group of military and civilian personnel which took over the responsibility of safeguarding Army aircraft activities within the plants of the manufacturers. To speed up inspection, central offices were established in the larger cities.

A new policy to eliminate dual control by the Army and Navy at any point where equipment is being produced for both Services give the responsibility for inspection to the Service with the preponderant contract interest in the plant.

A new Central Gaging Laboratory with constant temperature, humidity, and fluorescent lighting was established at Wright Field, as well as a Fuel and Lubricants Inspection Laboratory.

Experimental Development

Looking to the future, the Experimental Engineering Section continued the development of military aircraft of all types. During the past year, contracts were placed for the delivery of a number of experimental Pursuit and Bombardment airplanes, varying from conventional to unorthodox designs as a part of a continuous program to provide combat aircraft of superior performance and efficiency.

Extensive flight testing has been conducted for the purpose of developing airplanes, engines, superchargers, instruments, cameras, and all other aircraft accessories and equipment required by the Air Corps. New equipment has been designed or purchased and tested in an effort to secure recording devices and instruments which will improve the accuracy and efficiency of flight testing.

In order to provide a sound basis for the preparation of specifications for new aircraft and to check proposed designs submitted to the Air Corps for consideration, a design unit has been continuously engaged in preparing design studies of various airplanes. Preliminary designs thus prepared are subjected to careful scrutiny to determine their feasibility. Whenever a promising design is produced, a wind tunnel model is built and tested to give a check on computed performance. The results of these design studies and wind tunnel tests are made available to interested designers in the aircraft industry.

The problems of flutter and vibration become critical as the performance of airplanes increases. Continuous study and investigation of such problems is maintained to promote safety and to insure success in new designs. The airplane structure, control surfaces, engine, propeller, and even instruments and equipment installed throughout the structure are subject to careful check to avoid vibration frequencies and amplitudes which might lead to destruction of all or part of the airplane.

The possibilities of using various materials and methods of fabrication are under constant study. Experimental wings and even complete airplanes have been procured to determine the relative efficiencies of plywood, stainless steel, magnesium alloy, etc. Other projects investigated include spot welding of various alloys, the use of hollow and explosive rivets, modifications of structural design and simplification of fabrication methods.

Rapid advances have been made in the art of aerial photography and the materials and processes involved therein. The development of night photography utilizing flash bombs and of color photography for detecting camouflage has progressed well beyond the former state of the art. Means have been developed for rapidly processing exposed film and for quickly producing maps from aerial photographs.

A continuous investigation has been conducted by means of laboratory pressure chambers and actual flights to determine the effects of flight at all attainable altitudes on human efficiency. As a result, new and improved oxygen breathing apparatus has been developed and criteria have been established for the functioning of airplane pressure cabins. Since the success of a military mission depends largely on the

effectiveness of the combat crew, it is necessary to provide every reasonable means to prevent undue fatigue or exhaustion.

To be successful, the modern combat airplane must rely to a great extent on durable and accurate instruments. Developments during the past year have brought about improvement in the various engine instruments, vital to the safe operation of high-powered aircraft power plants. To enable the pilot to fly in all types of weather, flight instruments and radio equipment have been improved. Instruments of navigation, which permit long range airplanes to reach a distant objective, have been refined.

To enable a large combat force to operate in the field, great numbers of devices are required to permit rapid servicing and maintenance. Hence, facilities have been developed which provide for performing ground work in minimum time. Included are mobile field repair units for handling major repairs, small machine shop trailers for minor repairs, work shelters for crews, maintenance tool stands for mechanics, jacks for hoisting while servicing tires or landing gear, airplane paulins to protect against the accumulation of frost and ice, mechanics' clothing, engine heaters, gasoline generator units, fuel servicing trucks and many other items. The problems of ground equipment can never be neglected since the complexity of modern airplanes requires that constant and efficient ground service be maintained. Portable steel mats have been developed to permit rapid laying of runways on soggy fields.

Outstanding developments in the field of aircraft armament were made during the past year. The general trend in these developments has been toward the adoption of larger caliber and an increased number of machine guns and aircraft cannon for both offensive and defensive purposes. Installation arrangements were determined for both Bombardment and Pursuit type aircraft employing increased ammunition allowances, charging devices, and other apparatus necessary to the effective use of such installation. Substantial results were obtained in the development of gun sights applicable to use with both fixed and flexibly mounted machine guns, some of which instruments incorporate corrections for variants encountered in aerial gunnery, particularly ballistics, lead and range determination. Substantial advances were also made in the design of machine gun installations employing power-operated turrets or other type cockpit enclosures for application especially to various positions on Bombardment airplanes. Material advancement was accomplished in the design of fixed sighting equipment applicable to Pursuit, Fighter and Attack or Light Bombardment type airplanes. Extensive research studies and test programs were executed in connection with the development of the above projects with special reference to gun mounting problems and provision of recoil absorption devices applied to both fixed and flexible positions of small caliber machine guns and aircraft cannon. Such accessories have been reduced to practical form and assembly arrangements with a view to quantity production of such devices as required to equip future airplanes of the types in which both fixed and flexibly-mounted machine guns and cannon are installed. This program has involved extensive coordination with commercial supply sources and the Ordnance Department, particularly with reference to modifications of equipment required to accommodate the use of more recently developed machine guns and aircraft cannon. Improvements in cyclic rate and increased muzzle velocities have been subject to extensive development work by the Ordnance Department.

Developments in bombing equipment during the past year have resulted in advanced designs of the following items: Design of racks for use in carrying and releasing quantities of fragmentation or other small size bombs from the Bombardment airplanes in which the original installation provided only for the use of demolition bombs. Continued development of automatic releasing mechanisms includes improvement in intervalometers which control the spacing of successive bombs released in train. Improvements in bomb shackle designs which provide for carrying increased bomb sizes by means of necessary units in which weight and manufacturing difficulties have been reduced. Increased simplification of bomb rack and control mechanism design, as a result of which larger portions of bomb rack and control assemblies become contractor-furnished and are types particularly suited to the airplane model.

As a result of extensive studies and tests, specific requirements have been established for armor plate protection for both pilot and crew in Bombardment and Pursuit type airplanes. Special attention has been given to obtaining maximum degree of protection with the minimum involvement of increased weight. Installation of such equipment is now being made in all modern type airplanes undergoing procurement.

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A continual plea of the airplane designer attempting to obtain high per-

formance is for more powerful engines. To keep up to date, the engines used in airplanes are subjected to a constant process of development. Newly designed engines which are ground and flight-tested to prove soundness, usually can be increased in horsepower by from 20 to 30 per cent over a period of several years of service use. When the ultimate is reached for a particular type engine, a new design becomes necessary. Both liquid and air-cooled engines are being developed. To parallel the increased power, superchargers, pumps, carburetors, magnetos, and other accessories are continually improved.

In general, a new design or propeller is required for each radical change in airplane or engine design. The development of propellers has continued to meet the requirements of new airplanes and engines. The outstanding features of new propeller designs are full feathering, constant speed controls, hollow hubs which permit an aircraft cannon to fire through the center, and improved speed governors. Other developments include fabrication of hollow steel blades, molded cuffs or fairing to increase efficiency, and means to prevent the formation of ice on the blades. Constant speed and controllable propellers under development are actuated by hydraulic, electric, or mechanical linkage devices. As with airplanes, the new developments in propellers vary from small to large, some being 18 feet in diameter.

Special effort has been directed toward the development of synthetic or substitute materials to replace those which might be difficult to supply under wartime conditions. Synthetic fabrics of certain types have been tested and approved as a substitute for parachute silk and for use in corded tires. Certain cotton materials have been developed as a substitute for linen webbing used in parachute harnesses. A synthetic fabric is being developed as a substitute for present fabric control surface covering. Various metal alloys have been investigated to determine suitability for aircraft structures and parts. These include magnesium, beryllium, stainless steel, and various aluminum and steel compositions. Suitable paints for camouflage have been produced and tested.

The new engine test laboratory has come near to completion. Equipment is being delivered and installed. The new 20-foot high speed wind tunnel is also rapidly taking shape and will ultimately become a valuable source of aerodynamic information. Plans have been made for further expansion of the experimental plant in order to provide facilities for maintaining a development program which will provide military aircraft second to none in quality, performance and effectiveness.

Issue and Maintenance

The supply organization of the Air Corps, the Field Service Section, launched a widespread program of construction at the several Air Corps depots where supplies and maintenance of the Army Air Corps' airplanes are centered.

The latest design in large repair docks is being built at Fairfield and San Antonio Air Depots. This type of building will be used to house Transport Squadron airplanes and airplanes of the tactical groups in for overhaul.

Airplane repair buildings of the latest type are being constructed at Mobile, Ogden, Panama, and Hawaiian Air Depots. These buildings consist of large airplane repair docks with shop, and fuselage progressive repair areas located between. This building provides for the shop facilities necessary for the overhauling of all types of airplanes. The principal facilities being the sheet metal shop, machine shop, heat treating, plating, wood shop, stock and tool rooms, and many small related units.

A new equipment repair building has been designed which includes all of the latest features necessary for the proper overhaul of precision equipment. This building is completely air-conditioned and, in addition to the precision equipment, provides for the overhaul and repair of parachutes. This type of building is proposed for Middletown Air Depot and all new air depots which will be constructed in the future.

An engine repair building has been designed which provides sufficient floor space for the repair of 2400 airplane engine units a year. This building has been planned with a view of mass overhaul. This type building is now under construction at San Antonio Air Depot, Mobile Air Depot, Panama Air Depot, Hawaii Air Depot, Ogden Air Depot, and it is proposed for all depots to be constructed in the future.

A building has been designed for the repair of all aircraft radio equipment. This building is fully air-conditioned and is provided with all the facilities necessary for the repair of such equipment. A building for this type is proposed for all Air Corps depots.

In addition to the above, other buildings have been designed, such as Air Corps Reclamation, Depot Supply Warehouse, Chemical Warehouse, Paint, Oil, and Dope Warehouse and Air Freight Terminal. These buildings include all of the latest features required for the ac-

tivity concerned and are being constructed at many of the present Air Corps Depots and at the new Air Corps Depots. A contemplated increase of from 500 per cent to 600 per cent in civilian personnel required for the operation of the repair and supply depots has been planned to care for the increased operation of aircraft incident to the Aviation Expansion Program.

The Supply Branch of the Field Service Section has been materially expanded in order to meet the Air Corps Expansion Program requirements. This expansion has been necessary, first, to determine equipment and supply requirements; second, to initiate procurement for the required items; and, third, to effect proper distribution and storage of the supplies as received from contractors.

It has been necessary to expand greatly all branches of the Field Service Section during the calendar year to administer the technical and supply matters involved in the procurement and distribution of supplies and equipment for new organizations and stations. The procurement of this equipment during the Fiscal Year 1941 will involve over ten times the amount of funds spent for similar purposes during the preceding Fiscal Year.

President Roosevelt's tour of inspection at Wright Field on October 12th climaxed an unusually large number of visits of Government officials and committees. Earlier in the year, 450 West Point Cadets were flown to Wright Field in Army transports.

Four awards were conferred in recognition of accomplishment in the Materiel Division. Captains Samuel R. Harris, Jr., George E. Price and Mr. Raymond Whitney received the Distinguished Flying Cross for extraordinary valor and achievement during aerial flights. For work in the field of aviation medicine, Captain Harry G. Armstrong shared in the Collier Trophy Award.

With an average of 81 airplanes available, 17,997 hours of flying were logged, of which 3117 hours were test flights. Registrations by manufacturers' representatives on official business calls exceeded 50,000.

Military and civilian personnel were increased approximately 70 per cent since the end of 1939, increasing the present military strength to 316 and civilian to 3580.

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The Kelly Field News Letter Correspondent reports that two new Squadrons, (75th and 76th) are being activated at that field for transfer to Ellington Field, Houston, Texas.

STATE LEGISLATOR BECOMES FLYING CADET

Believed to be the only State Legislator ever to become an Air Corps Flying Cadet, Mason D. Harrell recently reported to the primary training detachment at Cal-Aero Academy's Ontario, Calif., field.

For two years a member of the Texas House of Representatives, Mr. Harrell retired from politics to enter the Air Corps. Upon graduating from the University of Texas in 1938, he was elected to the Legislature at the age of twenty-three and became the State's youngest lawmaker. He served continuously until the present time.

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CONGRESSMEN INSPECT CANAL DEFENSES

Congressmen Joseph W. Byrns, Tenn.; Thomas E. Martin, Iowa, and Forrest A. Harness, Ind., all of the House Military Affairs Committee, and Congressman Robert J. Corbitt, of Penna., member of the Foreign Affairs Committee, inspected the defenses of the Panama Canal following their arrival there on December 11th.

The visitors spent one day touring the Coast Artillery defenses of the Pacific side, with the personal guidance of Major General Sanderford Jarman. They started at Fort Amador and the Fortified Islands, proceeded to Howard Field, with its construction activities, followed by an operational demonstration of the big guns at Fort Kobbe and anti-aircraft batteries. After a lunch in the jungles with the anti-aircraft men, General Jarman and the Congressional party ended their inspection of the day at Madden Dam.

On the following day, December 13th, the Congressional party called in the morning on Lieut. General Van Voorhis at Quarry Heights. They were then escorted by Brigadier General W.E. Prosser on an inspection of barracks and other installations of the Panama Mobile Force at Fort Clayton and Camp Paraiso. Colonel W.E. Danielson greeted the visitors at the Construction Quartermaster's office, where the supervisory activities in connection with the extensive military construction program are concentrated.

Brigadier General Douglas B. Netherwood then conducted the visitors from Albrook Field on an aerial tour of the establishments of the Panama Air Force, including France Field and Rio Hato. The party was expected to pay a visit to the construction activity at Pedro Miguel Locks in the afternoon and then leave the following day to inspect military establishments on the Atlantic side.

ACTIVATION OF 15TH PURSUIT GROUP

The 15th Pursuit Group (F), latest unit of the 14th Pursuit Wing, Air Corps, was activated on December 1, 1940, under the command of Major Clyde K. Rich, A.C. Comprising Hqrs. and Hqrs. Squadron, 45th, 46th and 47th Pursuit Squadrons (F), the Group, manned by personnel from both Hickam and Wheeler Fields, moved into "Tent City" at Wheeler Field on December 2nd.

The command of the new Group passed from Major Rich to Captain Lorry N. Tindal, A.C., on December 6th, following the transfer of Major Rich to the 18th Pursuit Group (Int.) as its Commanding Officer.

Commanding officers of the individual squadrons of the 15th Pursuit Group are as follows:

Hqrs. and Hqrs. Squadron - 2nd Lieut. William E. Hubbard, II, A.C.

45th Pursuit Squadron, Captain Aaron W. Tyer, A.C.

46th Pursuit Squadron, Captain Thomas C. Musgrave, Jr., A.C.

47th Pursuit Squadron, Captain Gardon H. Austin, A.C.

Additional officer personnel, secured from other squadrons by transfer, follows:

Second Lieutenants John C. Wilkins, Air Corps; Howard H. Cords, Neal R. Day, William P. Martin, John Thogerson, Air Reserve; Albert D. Cummings, A.G. Res.; and Russel S. Quaintance, Inf. Res.

From the Mainland, via transport, the arrival of some 230 recruits swelled the roles of the several organizations. They will be turned over to the squadrons for training as potential Air Corps specialists.

Activities of the Group have been limited, of necessity, to setting up the various Staff sections, organization and housing problems, and other details incidental to the formation of a new unit. A great deal of pride, however, is felt at the unusual spirit of satisfaction and high morale evidenced by all personnel under conditions which may hardly be termed excellent. The manner in which little problems are met and solved bodes well for the future efficiency and morale of the 15th Pursuit Group (F).

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A Colonel's wife sent the following note to Capt. Greene:

"Col. and Mrs. Brown request the pleasure of Capt. Greene's company to dinner on September 15th."

To which she received the following reply:

"With the exception of five men on leave and three on sick list, Capt. Greene's company will take great pleasure in accepting your invitation."

- Davenport, Iowa, DEMOCRAT.

OBSERVANCE OF NATIONAL AVIATION DAY

The 36th Pursuit Group (Interceptor) included in its training schedule for December 17th a rendezvous at Kitty Hawk, N.C., in tribute to the first flight by the Wright Brothers on this date in 1903. At the exact minute of the first flight, the twelve airplanes representing the 36th Pursuit Group flew over the beautiful monument - 10:30 a.m.

This was probably the last opportunity the 36th Pursuit Group pilots will have for some time to pay this tribute to the aviation pioneers, since that organization was scheduled to sail for Puerto Rico the first part of January, 1941.

Major Ned Schramm, Air Corps, is Commanding Officer of the Group. Squadron Commanders participating in the flight were Major Glenn Barcus, Captains John Stevenson, Charles G. Harrington and 1st Lieut. James B League, Jr.

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GENERAL BROOKS ASSUMES COMMAND OF WESTOVER FIELD.

Brigadier General John B. Brooks, until recently Commanding Officer of Randolph Field, Texas, assumed command of Westover Field, Chicopee Falls, Mass., on January 6, 1941. He relieved Colonel Richard H. Ballard as Commanding Officer, and he will command the 4th Bombardment Wing when it moves to Westover and Bangor, Me., early this Spring. Meanwhile, General Brooks will spend much of his time between Westover Field and Bangor, where a supplementary base will be located. At noon, January 6th, General Brooks was formally introduced to his officers at a simple ceremony at the air base. He and Mrs. Brooks will make their home in Holyoke, Mass.

The first official act by General Brooks was to name Colonel Ballard as Executive Officer. This will have the effect of leaving the latter in charge of the administration of the field just as he has been since his arrival at this field last October. In addition to commanding the field, General Brooks will be in direct charge of the tactical units both at Westover Field and at Bangor.

Westover Field will be the site of a recruit reception center to which draftees in the 1st Corps Area will be sent. It will function in the same manner as the one at Fort Devens, and will receive newly inducted draftees from various parts of New England. Construction of buildings to handle 1,000 enlisted men is to begin shortly.

V-8698, A.C.

SUBSTRATOSPHERE TRAINING FOR ARMY AIR CORPS COMBAT CREWS
By the Materiel Division Correspondent

The opening of a school for the instruction of Air Corps officers in the new techniques of high-altitude flight with emphasis on the use of oxygen equipment was recently announced by the Air Corps Materiel Division, Wright Field, Ohio. The School is being conducted by the Wright Field Aero Medical Research Laboratory, under the direction of Captain Otis O. Benson, Jr.,* chief of the laboratory.

At Wright Field to begin the course are thirty officers from tactical and training centers of the Air Corps in various parts of the nation. They are taking a week's intensive training, including practical demonstrations in a huge altitude pressure chamber and in actual flight to altitudes of 30,000 feet.

The course is the first of four identical ones to be offered in successive weeks to groups of thirty Air Corps and Medical Corps officers, so that a total of 120 officers will have received the specialized training at the completion of the school. These officers are picked men, who will be supplied with copies of the lectures delivered during the course, to be taken back to their respective stations. The officers will then serve as instructors at their stations to pilots, Flying Cadets, and other flying personnel in the various techniques of high-altitude flight.

The School is the first of its kind ever conducted by the Army Air Corps. It is an outgrowth of the increasing importance of substratosphere flying in war tactics and maneuvers. Observations from European air battles indicate a constant trend toward the upper levels by Bombers and the interceptor planes which must combat them. As a result, instructions in the use of oxygen equipment and conducting various military operations in high-altitude flight are expected to become an integral part of Air Corps training within a short time.

"Existing Information on High Altitude Operations" will be the subject of a lecture by Captain B.S. Kelsey, Wright Field test pilot and engineer, recently returned from assignment to London as observer of the Battle of Britain. Major Turner A. Sims will describe performances of present and projected airplanes at high altitude. Captain Frank R. Cook will report on physical characteristics of the atmosphere in relation to high altitude flight. Captain Rudolph Fink will discuss and demonstrate oxygen and pressurized equipment.

Captain Benson will discuss "Parachute Escape at High Altitude," "Altitude Sickness and Air Sickness," and "Pilot Fatigue." Mr. Frank G. Manson, Wright Field equipment engineer, will discuss electrically-heated flying clothing.

Assisting Captain Benson in the lectures on the physiological aspects of flight in the upper levels are Dr. J.W. Heim, Dr. John F. Hall, Jr., and Dr. Ernest A. Pinson, of the Aero Medical Laboratory.

Technical lectures and demonstrations will consider the circulatory and respiratory systems, effects of cold and heat on the body, blood gases, aeroembolism, an ailment caused by too rapid ascent into the higher altitudes, carbon monoxide poisoning, effects of low barometric pressure on nasal sinuses, the middle ear and gastro-intestinal tract and similar subjects.

A series of demonstrations with the 40-foot altitude pressure chamber, in which the effects of high-altitude flight can be reproduced by a process which reduces the density of air within the chamber to that of any desired altitude, will be conducted. These will be climaxed by a reproduction of an ascent to an altitude of 38,000 feet conducted with members of the visiting classes as subjects, each equipped with proper oxygen masks and equipment to supply the additional oxygen needed at such a high altitude. In groups of ten, the visiting officers also will be taken aloft in a big Army Bomber to altitudes of around 30,000 feet for a mass test of the new oxygen equipment in high-altitude flight, and will receive instruction in the proper use of the oxygen equipment.

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The following-named officers were relieved from duty at Randolph Field, Tex., January 15, 1941, and assigned to duty at the Air Corps Basic Flying School at San Angelo, Texas: First Lieut. Don D. Cascio, 2nd Lieuts. Joseph W. Alley, Royce C. Anderson, Malvern H.W. Brown, Elliam B. Burns, Jr., Robert T. Calhoun, Beverly E. Carmack, Horace S. Carswell, Jr., Robert I. Choate, Leonard S. Dysinger, George A. Edwards, John C. Fenenbock, Francis B. Gowdy, Guy B. Gray, John K. Hardy, George W. Harris, Jr.

*Captain Benson is co-author with Walter M. Boothby and W. Randolph Lovelace, II, of the article "High Altitude and Its Effect on the Human Body," published in this and the previous issue.

THE HAWAIIAN AIR FORCE

The Hawaiian Air Force was activated on November 1, 1940, under the command of Major General Frederick L. Martin. Officers on the Staff are as follows:

Chief of Staff: Colonel W.O. Ryan;

Lieut. Colonel C.L. Bertholf, A.G.D., Adjutant General and A.C. of S., G-1;

Lieut. Colonel E.W. Raley, A.C. of S., G-2;

Lieut. Colonel W.J. Flood, A.C. of S., G-4;

Lieut. Colonel R. Beam, (AC) I.G.D., Inspector General;

Major A.F. Hegenberger, A.C. of S., G-3;

Captain R. Rhudy, C.O., Hqrs. and Hqrs. Squadron, H.A.F., and Assistant to the A.C. of S., G-4;

Captain R.B. Landry, Aide-de-Camp to the Commanding General, and Assistant to the A.C. of S., G-3.

Special Staff Officers are: Lieut. Colonel C.I. Hoppough, S.C., Signal Officer; Lieut. Colonel A.B. Custis, O.D., Ordnance Officer; Major M.E. Jennings, C.W.S., Chemical Officer; Major R.J. Erickson, A.G. Res., Assistant Adjutant General.

The Headquarters of the Hawaiian Air Force at present is located at Fort Shafter, T.H., in a building formerly occupied by bachelor officers of that post.

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THE 22ND BOMBARDMENT GROUP

After being separated since activation almost a year ago, the various units of the 22nd Bombardment Group (M), GHQ Air Force, came out of their isolation and rendezvoused at Langley Field, Va., on November 15, 1940. Since that time personnel of the Group have been hard at work organizing, becoming familiar with their new surroundings and carrying out as much tactical training as limited equipment permitted.

The officer personnel of the Group are enumerated, as follows:

Group Staff:

Lieut. Colonel John I. Moore; Majors Homer B. Chandler, Francis B. Valentine, Samuel W. Van Meter, Captains Fay R. Upthegrove, David P. Laubach, Millard L. Haskin, Dolf E. Muehleisen, Air Corps; Captain Wesley N. Gordon, C.A.C. Res.; 1st Lieut. Paul Waterman, 2nd Lieuts. Walter L. Callahan and Forrest R. Harsh, Air Reserve.

Hqrs. and Hqrs. Squadron:

Major Jack C. Hodgson, Captain Ralph E. Koon, 1st Lieut. Roger E. Phelan, Air Corps; 2nd Lieuts. Roger E. Phelan, Craig E. Walling, Louis K. Jacobs, John L. Richardson and Thomas R. Waddleton, Air Reserve.

2nd Bombardment Squadron:

Captains Hoyt L. Prindle, William L. Lee, Air Corps; 1st Lieuts. Richard C. Kugel, Otto B. McIver, Air Reserve; Raymond T. Peterson, John L. Sullivan, Edward R. Casey, Air Corps; 2nd Lieuts. Winfred O. Craft, James P. Collins, Jr., Willis C. Bumgarner, John F. Sharp, James H. Thompson, Air Reserve.

19th Bombardment Squadron:

Captains Kingston E. Tibbetts, Charles E. Wheatley, Eugene P. Mussett, Air Corps; 1st Lieuts. Hugh B. Manson, Jr., Air Corps, Arthur Y. Snell, Air Reserve; 2nd Lieuts. Waldemer L. Hawkins, Walter P. Maiersperger, LeRoy L. Stefonowicz, John J. Doerr, Albert J. Moye, Franklin S. Allen, Jr., and Charles A. Martin, Air Reserve.

33rd Bombardment Squadron:

Captains William Ball, Irving B. Selby, 1st Lieuts. George R. Anderson, William A. Garnett, Air Corps; 2nd Lieuts. Thomas P. Bacon, William W. Ottinger, William J. Headrick, Jr., John L. Fitzgerald, Jr., Berkeley I. Springfield and Robert E. Smith, Air Reserve.

A change is scheduled to take place on January 15, 1941. The 22nd Bombardment Group will form the 13th and 38th Bombardment Group (M) GHQ Air Force, eventually scheduled to go to Orlando, Fla., and Jackson, Miss., respectively.

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MacDILL FIELD NEARING COMPLETION

MacDill Field, Tampa, Fla., is rapidly taking on the appearance of a finished airdrome, and the framework of the second hangar to be erected is gradually nearing completion. From the air one can see permanent roads and buildings springing up amid the maze of temporary construction work. The long, wide runways are being cleared of all obstacles, as it is rumored that the Bombardment planes will be transferred to MacDill Field from nearby Drew Field within a fortnight. In fact, all that is lacking to make the field a serviceable dyed-in-the-wool airport is a network of high tension wires and a string of telephone poles around its borders, with a few air-space reservations scattered here and there.

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Second Lieuts. George O. Hubler, Charles M. Kirkland, Harold E. Moore, Tex M. Risher, Leland C. Schubert, Lloyd W. Sheppard, Wm. V. Taylor and Ollen Turner were relieved from duty at Randolph Field, Texas, and assigned to duty at the Basic Flying School, San Angelo, Texas, effective January 15,1941.

V-8698, A.C.

Southeast Air Corps Training Center

Construction work in the Southeast Air Corps Training Center, involving expenditures in excess of $1,500,000, is to be shifted shortly from the supervision of the Quartermaster Corps to the Army Engineer Corps, with headquarters at Mobile, Ala.

The Mobile district will have charge of work at Atlanta; Maxwell Field, Ala.; Meridian, Miss.; Montgomery, Ala., Municipal Airport; the new Southeast Air Depot, Mobile, Ala.; Selma, Ala.; Tallahassee, Fla., and Eglin Field, Valparaiso, Fla. This is in line with a recent War Department order directing the Corps of Engineers to take over all Air Corps construction work, except that in Panama.

Among the larger projects now under way in the Southeast Air Corps Training Center are the construction of hangars, barracks and auxiliary buildings and the grading of landing fields at the Montgomery Municipal Airport, Selma, and Eglin Field, also the construction of a number of barracks and mess halls at Maxwell Field.

A pecan grove is rapidly becoming "home" to 2,000 fledgelings Army flyers out on the Wetumpka highway. A golf course is being sheared of its traps and mounds to make a flying field. Miles of power lines, gas mains, water pipes and streets have been laid out.

Preparation for national defense calls for speed, and there can be no "Slow Men at Work" jokes about this WPA project. All the construction there has taken place since September 1,1940. The project is days - in some instances weeks - ahead of schedule.

The 34 barracks of the Air Corps Basic Flying School, Montgomery Municipal Airport, Ala., are 70 percent complete, and construction officers add with pride that only 40 percent of the funds appropriated for the project has been spent.

The long stucco buildings have been set in the midst of a pecan grove, but not a single tree has been cut down. Only 50 trees have been moved, and these have been carefully replanted in more advantageous places.

By some lucky planning years ago, the thousands of pecan trees were set out in perfectly straight lines, and the barracks have been built between each two lines of trees, so that each window looks out on two rows of pecans. The buildings were planned for the setting and the effect pleasing far beyond the usual bounds of utility. The grounds are being graded and grass seed will be sown as soon as the construction is finished.

In addition to the 34 barracks now nearing completion, appropriation is expected shortly to add 20 new buildings to the Basic Flying School. There will be seven more barracks, four mess halls and recreation rooms, three squadron administration buildings, one disciplinary barracks and fire station, one field infirmary, one post exchange and theater, two combination supply and recreation rooms and a communication building.

The buildings now under way run back three-fourths of a mile from the Wetumpka Highway. An average of 1100 men are on the job every day rushing the project to completion. The project has had a remarkable record of safety, for there has not been a serious accident there during the entire period of construction.

Only five percent of the workers are not certified for WPA help. Of the unskilled labor there, many have learned trades such as brick laying and tile setting on this job, and will be prepared for better positions when the project is completed.

A millwork shop on the grounds supplies all the window and door frames, and a railroad spur running to the project adds to speed and efficiency. Progress since the beginning has been the equivalent of one completed barrack building a day, notwithstanding the fact that care has been given to such details as ringing with brick each tree in places where the grade has been changed.

Each barrack is a long, narrow, stucco on hollow tile building, 187 by 32 feet, with a screened porch running its entire front length. Each has ten individual rooms, each two rooms connected by a bath. The roofs are red asphalt composition shingles, and the ceilings are of hard composition board, painted white. The interior walls are of white plaster.

Radiators and water tanks are heated with thermostatically controlled gas. The rooms were built to accommodate five men each.

Since construction is not completed, seven or eight men are now housed in each finished room. Each room is equipped with metal cots, two study desks and a row of metal lockers. Military neatness prevails.

In the mess hall, begun only three months ago, 200 men are now being fed each day.

The flying field is taking shape, dirt being moved at the rate of 9,000 cubic yards a day. But this is not an ordinary day, for men are working on the old municipal golf course 24 hours a day. Lights have been placed all over the field, and the machines used for the grading and filling stop only long enough to be lubricated and to change the operators.

Some 170 planes are now on the field, and this is its capacity in its present stage. Sixty additional planes are to be assigned to the field by Spring when the work thereon is completed. All the top soil from the field is being saved and will be placed on top of the raw red clay now exposed by the graders, and the entire field will be planted with grass seed. The workers pray for the rains to hold off until the grading is finished and the grass is planted.

Ryan School of Aeronautics, Hemet, Calif.

With more than $25,000 being expended to give Hemet Field a new hangar, eleven new barracks, larger classrooms, larger dining hall, and possibly a small auditorium, workmen and machinery started operations the last week in December. The work thus started was in anticipation of the new class of 130 cadets scheduled to begin training on January 3rd. The building operations now in progress may be extended still further if subsequent classes prove to be as large or larger than the January class.

According to Ryan School authorities, the new hangar will house the Ryan monoplanes now on order.

Personnel of the Ryan School, already totaling nearly 140 persons, are expected to be substantially increased with the completion of the building program. The additional planes and the additional number of cadets will necessitate not only a large ground crew but will probably mean additional maintenance men, more instructors and additional office help.

Three additional landing fields have already been obtained to aid in cadet training facilities. One of the new fields is at Moreno and the other two near Perris. The purchases already made include several hundred acres of land and, with two more fields being considered by the Ryan officials, auxiliary landing space would not be wanting.

Mr. R. Douglas Maw, Ryan Business Manager at Hemet Field, has been looking over several moving picture sound projection sets which may possibly be used in the proposed auditorium.

With Hemet Field already being cited by Air Corps officials as a model plant, it will undoubtedly be THE model training school of the United States when present construction work is completed, according to the News Letter Correspondent.

Selfridge Field, Mich.

As officers at the 6th Pursuit Wing base at Selfridge Field completed plans for the activation of five new Air Corps Groups, construction of 65 housing and operations buildings entered its final phase. The $666,000 temporary building project should be completed early in February, according to contractors' representatives.

With most of the window sash and doors installed, electricians, plumbers and sheet metal workers are well under way on their jobs. Refrigeration units and necessary insulation were being installed early in January, and work on kitchen installations has been started.

The paving of additional airplane runways and parking areas is approximately 90 percent completed. Additional night lighting and fuel distribution facilities for the flying field are practically completed.

Major General Julian L. Schley, Chief of Engineers, U.S. Army, completed his inspection of construction being rushed to completion at Selfridge Field on the occasion of his visit there on January 7, 1941. General Schley found the contractors well ahead of schedule on this $666,000 temporary Air Corps construction project, and he expressed himself as well satisfied with the progress being made.

Colonel R.G. Barrows, district engineer of the Detroit area, under whose supervision Selfridge Field contracts have been since December 17, 1940, and Colonel P.S. Reinecke, District Engineer of the Lake Survey district, accompanied the Chief of Engineers on the inspection trip. They were conducted around the post by Brigadier General Henry B. Clagett, Commanding General of the 6th Pursuit Wing base, Selfridge Field.

Savannah Air Base, Savannah, Ga.

Work on the barracks and other construction at the Savannah Air Base is progressing rapidly, and it is expected that all the men will be housed in the new "City" very shortly.

Westover Field, Chicopee Falls, Mass.

Construction work at Westover Field was halted for a few days as the driving rain in the early part of January interfered with the workers.

A 750-gallon pumper has been ordered by the Quartermaster to increase the efficiency of the Fire Department. A 500-gallon pumper is already on the field.

High Altitude and Its Effect on the Human Body. II

WALTER M. BOOTHBY, W. RANDOLPH LOVELACE, II, AND OTIS O. BENSON

The Mayo Clinic

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COLD AND AEROEMBOLISM

Until recently, anoxia (lack of oxygen), the prevention of which has just been discussed, was the most serious physiologic condition that aeronautical engineering had to meet. Today, however, while anoxia is paramount, there are two other conditions that must be met.

C O L D

The prevention of exposure to cold is a factor which is within the sphere of the engineers to control and to remedy. If an aviator is not protected from cold then he must try to protect himself by shivering or exercising; muscular movement, of course, requires extra oxygen and therefore the aviator will be obliged to use the large amount indicated on the flowmeters for greater activity.

Flights at 30,000 or 40,000 feet require protection against cold of tremendous severity (-40° to -55°C. or -40° to -67°F.). In the Finnish campaign, flying was apparently carried out with ground temperatures of -40°C. Clothing alone, as pointed out by Matthews,[10] will not protect the body at very low temperatures at high altitudes without adequate oxygen because the loss of heat from the lungs alone, by conduction and vaporization, will be in excess of what, under the circumstances, the body can furnish.

A E R O E M B O L I S M

The other great danger to an aviator is that of aeroembolism. This is not a new disease, but a new name, introduced by Armstrong, to indicate conveniently the well recognized and frequently fatal condition which afflicts divers and caisson workers. By them it is called caisson disease or bends.

If a glass of water is taken into a low pressure chamber, gas bubbles, like those of ginger ale, will start to form at elevations simulating those of about 18,000 feet and become, in rapid ascent, very numerous at 25,000 feet. Bubble formation will occur within the body, in the tissue fluids and in the blood stream if the ascent is rapid without proper preliminary decompression (or denitrogenation) by the inhalation of pure oxygen while at the same time actively exercising. Danger of aeroembolism begins at approximately 1/2 atmosphere (18,000 feet) although symptoms of sufficient intensity to be serious are infrequent below 30,000 feet, at least if too long a stay is not made at the high altitude.

There are several reasons why occurrence of aeroembolism in the past has been rare. The chief reason is that only recently have airplanes been able to ascend with sufficient speeds to altitudes above 18,000 feet; both speed of ascent and absolute altitude reached are factors concerned in the production of many bubbles. Half the total nitrogen in the body can be eliminated, according to Behnke,[11] in approximately forty minutes if the nitrogen in the inspired air is essentially zero as the result of the inhalation of pure oxygen, although eighty minutes are required to eliminate half of the nitrogen in the fatty tissues. Therefore, during a normal ascent (around 1000 feet per minute to 18,000 feet) especially if the pilot starts breathing pure oxygen soon after taking off, a great deal of the nitrogen will be eliminated before the external partial pressure is less than half of the nitrogen pressure in the tissues, as the latter has been falling during the slow ascent. Another reason why the symptoms of the formation of air bubbles in aviators are less frequent than in divers and are less severe when they do occur, is that the actual mass of gas in the bodies of the former is very much less than that in the bodies of the latter. Under the normal pressure of 1 atmosphere, approximately 1 liter of nitrogen is dissolved in the body tissues; in aviation, therefore, in an ascent to 3/4 atmosphere, only 0.75 liter of nitrogen will be liberated into gas bubbles. However, in diving, with the total pressure equivalent to 4 atmospheres, and assuming the diver has been down long enough to be in approximate equilibrium with this pressure, 4 liters of nitrogen would be dissolved in the body fluids. Consequently on rapid ascent 3 liters instead of 0.75 liter of nitrogen would be available to form bubbles. Therefore, not only will the bubbles be larger in the case of the diver, but they will be much more numerous.

Another important fact which is of great benefit to the aviator is that descent is the best possible treatment and is automatic and spontaneous in his case. If a diver develops symptoms in coming up to the surface, he will have to be recompressed in a chamber and subsequently will have to be very slowly decompressed. A pilot might be paralyzed and made unconscious, following rapid ascent, by air bubbles at 35,000 feet and yet it is barely conceivable that by the time he had fallen to 10,000 feet he would have regained consciousness and be capable of pulling his plane out of the dive. The chances are, however, that he would crash.

PREVENTION OF AIR EMBOLISM

Because of the serious dangers resulting from aeroembolism an attempt has been made to develop a practicable method for its prevention by means of decompression (or denitrogenation) with oxygen just before ascent. Up to the present in the low pressure chamber (Fig. 2), a total of 102 simulated ascents to an altitude of 30,000 feet or more using the B.L.B. apparatus have been made. Of these, eighty ascents were to 35,000 feet or more, thirty of them being to 40,000 feet. Although the simulated high altitudes as a rule were maintained for only a short time (ten to thirty minutes), in one instance two subjects remained at 35,000 feet for two hours and fifteen minutes without development of any untoward symptoms.

In some of the early ascents of the series a certain train of symptoms was observed which was considered suggestive of aeroembolism. These symptoms were lightheadedness; smarting and stinging of the eyelids; formication or crawling sensation over the skin; and pains in the extremities, around the joints or along the tendon sheaths or nerve trunks. At no time have

any of the subjects been paralyzed, become unconscious or experienced any of the symptoms mentioned above in such severity as to cause alarm; however, as soon as any one or more of the above symptoms mentioned appeared, the ascent was not only immediately stopped but usually a descent of about 5000 feet, or until the symptoms disappeared, was effected.

Nearly all of the earlier simulated ascents were made without preliminary decompression and with the subject using oxygen with the B.L.B. apparatus at the rate of flow stated above to be appropriate for the actual elevation. Under these conditions, although the simulated ascents were slow, closely following the standard time table recommended by the navy for decompression of divers, the subjects frequently reported that at about 20,000 feet one or more of the symptoms mentioned appeared in very mild form. However, there was no positive evidence that the symptoms noted were due to aeroembolism. The indirect evidence was that after preliminary decompression with oxygen was begun, there were no longer any similar symptoms at these comparatively low altitudes. On the other hand, in some of the more recent experiments, there have been similar symptoms at a simulated altitude of from 30,000 to 40,000 feet, even after preliminary decompression with oxygen for forty to forty-five minutes, with the subject sitting.

The next step in the investigation was to combine inhalation of oxygen with exercise. It was then found that symptoms no longer occurred, even if the period of decompression was reduced to thirty minutes, provided the exercise was the equivalent of walking at 2 miles per hour on a treadmill accompanied by considerable movement of the arms. The symptoms occurred occasionally when the decompression time was shortened or the intensity of the exercise was decreased and the rapidity of ascent increased. The maximal rate of simulated ascent was 4700 feet per minute and was achieved without symptoms of aeroembolism; the subject had walked at the rate of 2 miles per hour for thirty minutes before ascent while inhaling 100 per cent oxygen continuously.

The authors believe that the various reports of symptoms developing after what was considered as adequate decompression with oxygen are due to the fact that either the subject did not receive 100 per cent oxygen or he did not inhale the oxygen while exercising with sufficient intensity for a long enough time to eliminate the nitrogen. In other words, the attempt at decompression was for some reason or other inadequate.

Behnke,[11] working in the Research Laboratory of the Diving Unit at the Washington Navy Yard, is the most recent investigator to study the rate of elimination of nitrogen from the body when oxygen is being inhaled. However, the experiments which he has reported have been carried out without the subject performing a material amount of exercise. The work at the Mayo Clinic on this problem has been in progress only for a short time and as yet too few experiments have been made to form the basis of a detailed report. The preliminary data, however, indicate an increase of from 50 to 100 per cent in the rate of elimination of nitrogen from the body while 100 per cent oxygen is being breathed as a result of the subjects' walking at the rate of 3 miles an hour instead of sitting down.

PARACHUTE DESCENT

There are three types of parachute jumps: (1) jumping very close to the ground such as has been developed for landing troops, (2) intermediate jumps, to save life, from elevations up to 20,000 or even 25,000 feet, and (3) jumps also to save life, from heights as great as 35,000 or 40,000 feet.

The third kind of parachute jump only will be discussed here. Jumps from these heights are made whenever abandonment of the ship is necessary to save life. After the necessity arises for bailing out with probable injury to the oxygen supply, a minute probably would elapse before the preparations to jump can be completed. At an elevation much above 25,000 feet cerebral anoxia would be present at the end of a minute without oxygen and unconsciousness would begin to develop. Even if the aviator descended as a free falling body until he reached 20,000 feet, he would in the second minute become unconscious, and therefore, be unable to pull his rip cord, although he might come to and be able to do so during the last few thousand feet. On the other hand, if he pulled his rip cord within a few seconds after he left the plane, he would soon become unconscious and it would take from five to ten minutes to descend to an altitude at which he would have sufficient oxygen to regain consciousness. He still might not be able to do so because of too long an exposure. Therefore, a parachutist should be provided with special oxygen inhalation equipment for a parachute descent from high altitudes.

FIG. 8. B.L.B. oronasal inhalation apparatus for military use at high altitudes. NOTE: mouthpiece and automatic air regulator in main oxygen supply line and inset, mouthpiece in aviator's mouth for parachute descent. The oxygen supply cylinder with two single stage reducing valves, flowmeter and booster are shown.

Such an apparatus has been devised (Figs. 8 and 9) consisting of a small emergency cylinder of oxygen, special connections and mouthpiece. The emergency cylinder contains 34 liters, which is sufficient to last ten to fifteen minutes and to maintain consciousness. In fact, it is sufficient, if the aviator is

properly trained in its use, to maintain him in essentially normal condition during descent from 40,000 to 15,000 feet, at which height he will, of course, be safe. The emergency cylinder can be carried in a specially constructed and strongly reinforced pocket in his trouser leg. Under ordinary conditions this emergency cylinder is "by-passed" by the regular oxygen supply lines but it is instantly available by opening the valve and disconnecting, by means of a "bayonet" type of connector, the supply tube from the main oxygen tank.

As the mask probably would be blown away during the act of jumping out of the plane, it is necessary to supply a mouthpiece with an automatic sponge rubber expiratory-inspiratory valve which the aviator places in his mouth before jumping. This mouthpiece can be incorporated as a permanent fixture in the oxygen supply line, about 8 to 12 inches from the place it enters the reservoir bag of the B.L.B. inhalation apparatus. The aviator, after disconnecting his main supply line, pulls off his mask, disconnects it from the mouthpiece, grasps the mouthpiece firmly with his teeth, and opens the emergency cylinder valve and jumps. This procedure can be accomplished in a few seconds. Tests have been made with perfect ease insofar as the actual time element is connected from a simulated altitude of 35,000 feet, in a low pressure chamber, with descent at the calculated rate of a parachutist. As yet tests have not been made in an actual jump from a plane at a high altitude.

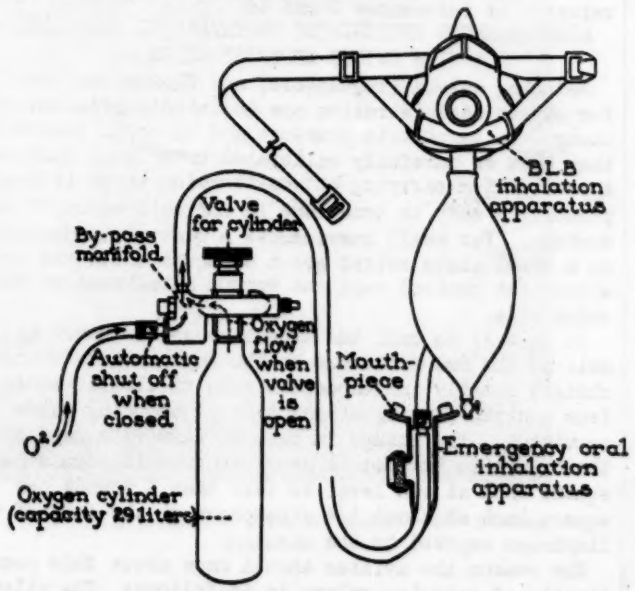


FIG. 9. Diagrammatic sketch of special arrangement of oxygen apparatus for emergency parachute descents from altitudes in excess of 30,000 feet.

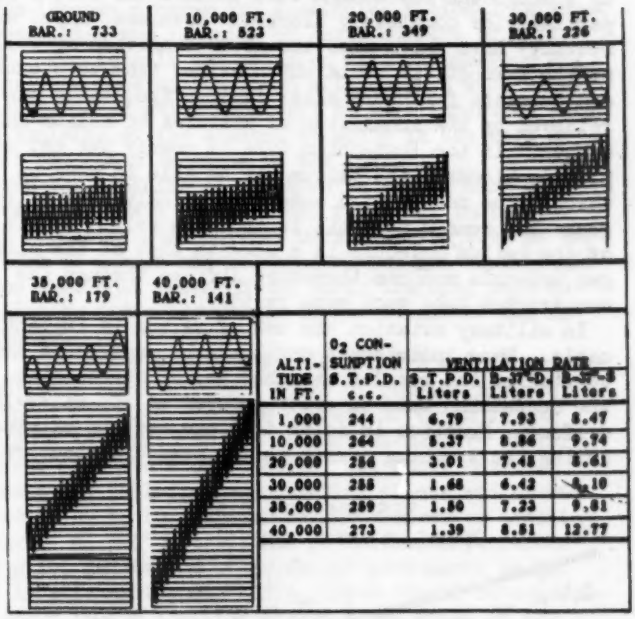
MISCELLANEOUS PHYSIOLOGIC OBSERVATIONS

Eye. In conjunction with Cusick[12] the authors have found that decrease in barometric pressure equivalent to that at an altitude of 35,000 feet provided anoxia is prevented, does not produce any recognizable changes in the eye. Anoxia causes dilation of the vessels of the fundus with intensification of the blueness of the venous blood. If the anoxia is sufficiently great, the arterial blood can be demonstrated by color photography to be definitely bluish. Conversely, inhalation of 100 per cent oxygen at sea level causes the venous blood to become more arterial in character in spite of a definite but slight decrease in diameter of the arterioles.

Electrocardiogram. Decrease in barometric pressure causes no demonstrable alteration of the electrocardiogram provided anoxia is prevented; anoxia, regardless of the barometric pressure, produces its well-known characteristic changes.

Blood Pressure and Pulse Rate. Decrease in barometric pressure causes little or no change either in pulse rate or blood pressure if observations are made under the same degree of activity and without anoxia.

Oxygen Consumption, Rate of Respiration and Rate of Ventilation. These are all essentially unaffected by changes in barometric pressure provided the development of anoxia is prevented by inhalation of oxygen. The data showing this are summarized in Fig. 10.



ALTITUDE IN FT.	O_2 CONSUMPTION S.T.P.D. c.c.	VENTILATION RATE S.T.P.D. Liters	B-37°-D. Liters	B-37°-S Liters
1,000	244	6.79	7.93	8.47
10,000	264	8.37	8.86	9.74
20,000	256	3.01	7.48	8.61
30,000	255	1.66	6.42	8.10
35,000	259	1.80	7.23	9.81
40,000	273	1.39	8.81	12.77

FIG. 10. Respiratory curves, oxygen consumption, and ventilation rate at various altitudes.

In the course of this paper several references have been made to the fact, well known to physiologists, that lack of oxygen is not a respiratory stimulant and that a subject will show no distress and slight increase in rate or depth of respiration from continuing to breathe decreasing concentrations of oxygen. This is illustrated in Fig. 11a and is very important to aviators because flyers may become unconscious at high altitudes without knowing they are in danger. At the end of the experiment the subject was very cyanotic (blue) due to lack of oxygen and was already beginning to lose consciousness and would have done so completely in another few seconds if the experiment had not been terminated instantly; the great danger was the fact that he did not realize that he was in danger because he experienced no discomfort or distress even toward the end of the experiment. This entire experiment was only about twenty-seven minutes long; and the subject of the experiment was above the simulated altitude of 15,000 feet only six minutes - a continuation of another minute and the subject might have collapsed from which he might not have recovered. This is a dangerous type of experiment to conduct and should only be done by physicians thoroughly conversant with these dangers.

Contrast the results of this experiment with those shown in Fig. 11b where the respirations are markedly increased with great respiratory discomfort and distress as a result of increase in carbon dioxide from rebreathing oxygen without removal of the carbon di-

oxide by soda lime. Carbon dioxide, through the fact that it increases the hydrogen-ion concentration of the blood, is the chief regulator of the respiratory* mechanism as was shown in 1905 by Haldane and Priestly.[13]

Effect of Reduction of Pressure on the Middle Ear. As A.D. Tuttle of United Air Lines has remarked, the distress and pain caused from increasing external pressure on the outer surfaces of the ear drum in descent is one of the most serious annoyances to passengers with which commercial airlines have to contend. The distress is due to the fact that the pressure inside the middle ear cannot be equalized by passage of air up through the Eustachian tube because the latter is partially or completely blocked. Lovelace, Mayo, and Boothby[8] have shown that the acute condition as well as the aero-otitis media which arises from this cause and persists for hours after landing frequently can be relieved by the inhalation of mixtures of helium and oxygen. If the Eustachian tube is nearly but not completely blocked, the helium may be able to pass up through the constricted tube more quickly than nitrogen. The reason for this is that the weight or size of the helium molecule is a seventh that of the nitrogen molecule and can therefore diffuse through the constricted tube much more rapidly.

In military aviation the use of helium is impracticable. Many individuals can learn by experience how to utilize the muscles attached to, or surrounding, the Eustachian tube in order to open up its valve-like orifice. Practice in doing this can best be obtained during the training period in low pressure chambers.

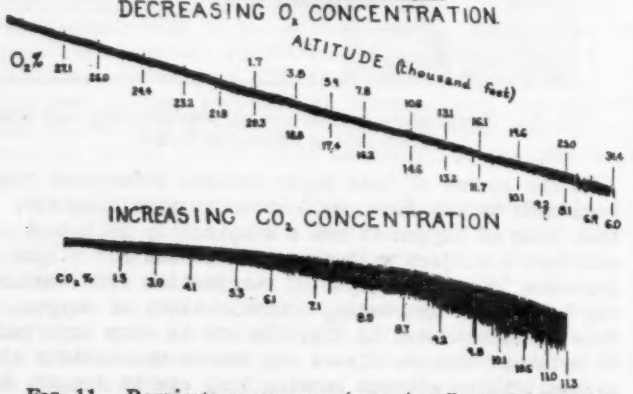


FIG. 11. Respiratory curve; a (upper), effect of breathing decreasing concentrations of oxygen; b (lower), effect of breathing increasing concentrations of carbon dioxide (with ample oxygen).

However, if the Eustachian tubes become completely closed, the aviator must be grounded or an adequate opening in the ear drum made surgically to prevent excruciating pain in descent.

Attention is directed to the fact that unless an equal pressure can be maintained in both middle ears, the aviator's sense of equilibrium may be so seriously disturbed that he is likely to fly improperly, usually with one wing down; therefore, if one ear drum ruptures spontaneously, the other may have to be treated surgically if the corresponding Eustachian tube is obstructed.

* However only pure oxygen should be supplied aviators; they should not be provided with tanks of oxygen to which small percentages of carbon dioxide have been added.

Pneumothorax. Some individuals may unknowingly have an accumulation of air or gas in the pleural cavity. In most instances, however, they will be aware of the fact, because artificial pneumothorax frequently is intentionally induced by injection of air into the pleural cavity in the treatment of pulmonary tuberculosis. Naturally as elevation increases the volume of the gas in the pleural cavity expands and will cause undesirable and possibly dangerous pressure on the lungs, heart, and diaphragm. In consequence patients with pneumothorax should not fly, at least shortly after a refill. A patient with bilateral pneumothorax should never enter an airplane.

Intestinal gases. The gases in the stomach and intestines expand on ascent. The volume of such gas would at 18,000 feet be double and at a little over 30,000 feet would be nearly four times its original volume. This expansion naturally causes considerable distress and if marked will interfere with respiration. Gas-forming foods like beans should be avoided. If there is difficulty in getting rid of the gas by natural processes, considerable help can be obtained by taking 1 or 2 tablets of animal charcoal; this is an efficient absorbent for gases. Stewardesses on airlines should have these available in case a passenger has much distress from gas.

The Blackout. An investigation of the "blackout" or the effects of acceleration and of centrifugal force has not been carried out by the Mayo Clinic. For an excellent presentation of this subject, the reader is referred to references 2 and 14.

MISCELLANEOUS ENGINEERING OBSERVATIONS ASSOCIATED WITH OXYGEN ADMINISTRATION

Reducing valves (regulators) and flowmeters used for oxygen administration are definitely affected by changes in barometric pressure and by cold; therefore they must be carefully calibrated under such conditions. Apparatus for carrying out calibration tests is comparatively easy to construct in any well-equipped laboratory. For small instruments a glass bell jar placed on a steel plate raised about 4 inches above the table allows for control taps and vacuum attachment to the under side.

It is well to call the attention of the users as well as the manufacturers to the fact that barometric changes greatly influence the rate of flow obtained from a given setting of any type of reducing valve or regulator. The change in rate of flow is caused by the change in barometric pressure from 15 pounds per square inch at sea level to less than 4 pounds per square inch at about 1/4 atmosphere on the face of the diaphragm exposed to the air.

The reason the aviator should know about this peculiarity of reducing valves is as follows: The pilot of a combat plane may be sitting quietly and flying along at 20,000 feet with his rate of oxygen flow properly set for the B.L.B. apparatus for his actual elevation at 1.0 liter per minute. His alveolar oxygen pressure would therefore be normal. Suddenly he sights an enemy plane and starts to climb but forgets to increase his oxygen flow; under these conditions by the time he reached 30,000 feet the ordinary type of reducing valve would be delivering less oxygen than at 20,000 feet: in fact, the two stage regulator which we tested would deliver only about 0.85 liters per minute at 30,000 feet instead of the 1.0 liters per minute which it had been giving at 20,000 feet. As 1.7 liters per minute are required to maintain normal alveolar oxygen at 30,000 feet, the aviator would be in a precarious condition from insufficient oxygen. Conversely, if a reducing valve is set to deliver 2.1

liters at 35,000 feet, and the aviator descends to 10,000 feet, the flow may be increased by 50 per cent to around 3.0 liters when he needs only 0.5 liter, thus wasting his oxygen reserve. Attempts are being made to develop a "booster" which will automatically compensate correctly for changes in altitude; unfortunately none which are sufficiently simple and rugged to withstand actual military work are at present available. In the meantime these facts must be impressed on all aviators during their training period. The magnitude of these flow changes should be determined for all types of reducing valves or regulators used in aviation.

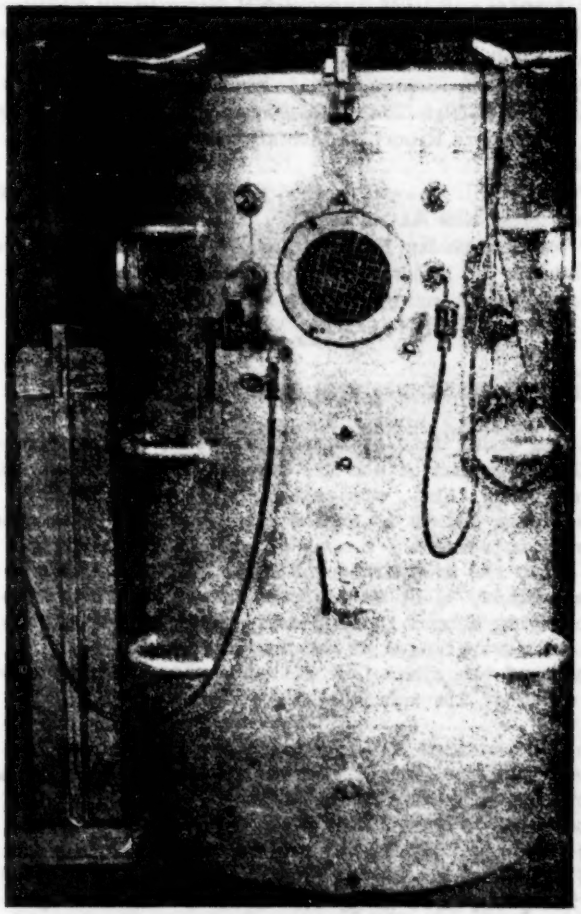


FIG. 12. Individual low pressure chamber for training aviators.

Flowmeters also will be affected by changes in altitude. Each type must be calibrated to indicate the proper minimal (aviator, inactive) and maximal (aviator, very active) rates of flow for each altitude. Such calibration can be carried out conveniently in a small low pressure chamber. Also whether or not low temperatures (-50°C.) seriously affect the amount recorded as delivered must be determined. If, at cold temperatures, the amount of oxygen delivered increases as much as 25 per cent, this change can be neglected. However, if any particular flowmeter should deliver even as little as 10 per cent less oxygen than that needed for any given altitude, then proper methods of correcting for this change must be provided. A slight excess delivered will do no harm, but a slight insufficiency must be avoided.

Flowmeters are of two types: The first type is known as the kinetic type in which the actual flow of oxygen is measured by a float of some type in a glass tube. Its advantage is that it measures actual flow and does not indicate a flow unless the oxygen is actually flowing. The second type is a pressure flowmeter which indicates the pressure in the pipe line or low pressure chamber of the reducing valve and indicates that a certain rate of flow of oxygen will be delivered if the special sized porthole does not happen to be stopped up. The disadvantage, which is believed to be a real danger, of this static type of flowmeter is that it indicates that oxygen is flowing whether it is actually doing so or not.

TRAINING OF AVIATORS IN THE CARE OF THE HUMAN MACHINE IN THE AIR

The immense program for developing national defense contemplates the training of large numbers of aviators. The schools for aviation will be numerous and large; the instruction given will cover a wide range of subjects of which none will be more important than the training of the student aviators in the care of their own human machines in the air.

Even the training of aviators in taking care of themselves covers such a broad field and includes such different and entirely unrelated subjects as the effects of anoxia and of acceleration and centrifugal force that both research and basic training must be handled by different groups of investigators and instructors.

TYPES OF COURSES

At least three distinct types of courses must be developed: (1) comprehensive courses to train flight surgeons to establish and conduct elementary training courses at schools of aviation, (2) short advanced courses for full-fledged operating pilots and crews, in addition to the regular continuous review training programs already set up, and (3) elementary courses for pilot cadets and other flight personnel; as an aid in eliminating the unfit, these should be scheduled early in the training period while still on the ground.

All types of courses must be similar in basic principles whether they are run by the Army, by the Navy, by the Civil Aeronautics Authority, or by the commercial air lines. In no way should research be mixed up with training. After the initial stages of developing a proper course have been passed through, the laboratories and personnel connected with research in aviation medicine must be separated and kept distinct from those concerned with training, except at the higher centers of command. There the new facts brought out by the research staff should be weighed and correlated; subsequently appropriate changes in training methods should be ordered.

LECTURES

The material presented in this paper would, in conjunction with other similar work, form the basis of a series of lectures illustrated by charts, lantern slides, and practical demonstrations on the subjects of anoxemia and aeroembolism.

LOW PRESSURE CHAMBER

The chief part of the course would be practical training in the low pressure chamber. First of all, the students should be taught how to use their muscles to keep their Eustachian tubes open on fast ascents and descents. Then they should find out at what level they become anoxic and incapable of carrying out simple tests of the code type. They should be taught how to decompress by inhalation of 100 per cent oxygen during active exercise preliminary to ascent and they should be taken to a simulated high altitude rapidly and shown that when properly decompressed and properly supplied with oxygen they can

go to high altitudes with safety.

In the advanced military courses aviators should be given practical experience and extensive practice in the chamber in the use of the oxygen equipment at altitudes between 30,000 and 40,000 feet including manipulation of the special oxygen equipment for emergency or parachute descents.

A chamber of medium size (6 feet long and 4½ feet in diameter) is sufficiently large for nearly all types of research problems, and can also be used for training purposes. However, specifically for use in training, groups of small pressure chambers just large enough to hold one student are preferable. The instructor would be in the front of a semicircle of ten or twelve of these small tanks; student assistants would be available to supervise each one or two chambers. The instructor would be connected with the pupils inside each small tank by telephone, over which he would give his explanations and orders. Each student would control the elevation inside his own pressure chamber according to orders. The chief duty of the student assistant outside the chambers would be to take over the controls in case a student inside fainted, lost his head, or collapsed from other causes. Groups of ten individual low pressure chambers, each costing with electric motor and vacuum pump approximately $250, could be installed for a total cost which would be probably less than the cost of the installation of a chamber sufficiently large to accommodate ten students with an instructor. The increased flexibility of groups of individual chambers for different types of instruction and for varying sized classes would be an important consideration.

It must always be remembered, too, that if there are several individuals in one large chamber, at least one of the students is likely to have ear trouble thus necessitating a very slow descent and delaying the work of both instructor and the other students. The fainting of one member of the class could be much more conveniently handled in the individual chamber with the help of the student assistant without interruption of the work of the other students, as would be the case in the large chamber.

References, Parts I and II

[1] McFarland, R. A., and Evans, J. E., *Alterations in Dark Adaptation Under Reduced Oxygen Tensions*, American Journal of Physiology, No. 127, pages 37–50, August, 1939.

[2] Armstrong, H. G., *Principles and Practice of Aviation Medicine*, Williams and Wilkins Company, Baltimore, 1939.

[3] Boothby, W. M., and Lovelace, W. R., II, *Oxygen in Aviation: the Necessity for the Use of Oxygen and a Practical Apparatus for its Administration to both Pilots and Passengers*, Journal of Aviation Medicine, No. 9, pages 172–198, December, 1938.

[4] Boothby, W. M., *Oxygen Administration: the Value of High Concentrations of Oxygen for Therapy*, Proc. Staff Meeting, Mayo Clinic, No. 13, pages 641–646, October 12, 1938.

[5] Lovelace, W. R., II, *Oxygen for Therapy and Aviation: an Apparatus for the Administration of Oxygen or Oxygen and Helium by Inhalation*, Proc. Staff Meeting, Mayo Clinic, No. 13, pages 646–654, October 12, 1938.

[6] Lovelace, W. R., II, Boothby, W. M., and Benson, O. O., *Aeroembolism: a Medical Problem at High Altitude and its Prevention by the Inhalation of 100 per cent Oxygen*, Scientific Monthly; in press.

[7] Lovelace, W. R., II, *The Necessity for the Use of Oxygen in Flying at High Altitudes*, Photogrammetric Engineering, pages 111–122, July-August, 1939.

[8] Lovelace, W. R., II, Mayo, C. W., and Boothby, W. M., *Aero-otitis Media: its Alleviation or Prevention by the Inhalation of Helium and Oxygen*, Proc. Staff Meeting, Mayo Clinic, No. 14, pages 91–96, February 8, 1939.

[9] Boothby, W. M., Lovelace, W. R., II, and Uihlein, Alfred, *The B.L.B. Oxygen Inhalation Apparatus: Improvements in Design and Efficiency by Studies on Oxygen Percentages in Alveolar Air*, Proc. Staff Meeting, Mayo Clinic, No. 15, pages 194–206, March 27, 1940.

[10] Matthews, B. H. C., *Loss of Heat at High Altitudes*, Journal of Physiology, No. 77, pages 28p–29p, December 17, 1932.

[11] Behnke, A. R., *The Application of Measurements of Nitrogen Elimination to the Problem of Decompressing Divers*, U. S. Naval Medical Bulletin, No. 35, pages 219–240, April, 1937.

[12] Cusick, P. L., Benson, O. O., Jr., and Boothby, W. M., *Effect of Anoxia and of High Concentrations of Oxygen on the Retinal Vessels*, Preliminary Report, Proc. Staff Meeting, Mayo Clinic; in press.

[13] Haldane, J. S., and Priestley, J. G., *Respiration*, Yale University Press, New Haven, 1935.

[14] von Diringshofen, Heinz, *Medical Guide for Flying Personnel*. Translated by Major Velyien E. Henderson, University of Toronto Press, Toronto, 1940.

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PROGRESS OF FLYING TRAINING AT MONTGOMERY, ALABAMA

Writing under date of January 2, 1941, the News Letter Correspondent of the Air Corps Basic Flying School at Montgomery, Ala., states that a new class of Air Corps Flying Cadets is expected to arrive on that date and will increase the number of Cadets by more than 200. With the arrival of the new class, 41-D, the present class, 41-C, is expected to graduate from the Basic Flying School in four or five weeks. The holidays and several days of bad weather has delayed training of the class, but with the class already getting ahead of its schedule, this time will soon be made up.

The long awaited day for the Flying Cadets finally arrived when the Group Order was published listing the promotions of the outstanding Cadets to Captains and Lieutenants. Flying Cadet S.A. Adger was appointed Group Commander (Captain); A.J. Fisher, W.C. Higgins, and J.E. O'Neal as Captains; A.D. Burns, R.L. Lucas, R.T. Thompson, L.C. Long, E.W. Thomas, W.A. Krell, R.L. Stevens, J.L. Burke, E.G. Dueringer, F. Sharpless, G.K. Close, K.A. Gaskin, W.A. McAffee and R.C. Bawl as Lieutenants. Cadet Krell was designated as Group Adjutant and F. Sharpless as Group Supply Officer.

Two hundred enlisted men will probably be sent to the Air Corps Technical Schools after the holidays are over. When these men return after their course of instruction is completed, the Basic Flying School will have one of the best, if not the best, group of experienced personnel in the Air Corps.

The construction of the post, begun in August, continues at a rapid rate. At the present time the buildings are approximately 80% completed, and the work of turning the Montgomery Municipal golf course into a flying field has come up to 40%. This work has been the cause of much wailing and gnashing of teeth on the part of the many civilians; their pet moan was "you're playing hob with the best course in the State."

Work on the buildings and air field was slightly held up during the past week by heavy rainfall.

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NEW SQUADRONS FORMED AT MITCHEL FIELD

Under the War Department expansion program, which was conceived and planned early in 1940, the basic units of the new wings are rapidly being formed. In accordance with instructions from the Commanding General of the 2nd Wing, Langley Field, Va., the following units were activated as of December 18, 1940, and are at Mitchel Field, L.I., New York:

Headquarters and Headquarters of the Northeast Air District;

Headquarters and Headquarters Squadron of the 7th Pursuit Wing, GHQ Air Force; and

Headquarters and Headquarters Squadron of the 4th Bombardment Wing, GHQ Air Force.

Headquarters and Headquarters Squadron of the Northeast Air District, with an initial strength of 200 enlisted men taken from the Air Corps Detachment and the 2nd Air Base Group (R), is under the command of Major Peter C. Borre, who was formerly in command of the Recruit Training Section of Mitchel Field. This unit will probably be transferred in the near future to Hartford, Conn., which has been tentatively selected as headquarters of the Northeast Air District.

Headquarters and Headquarters Squadron of the 7th Pursuit Wing will remain at Mitchel Field and is under the command of Captain A.J. Kerwin Malone. The organization consists of 26 men and has taken over two barracks and a storeroom on the West side of the parade grounds. The authorized strength is 147, and the Squadron will no doubt have more buildings in the near future.

Captain Malone, who is Base S-2 and Public Relations Officer, will be relieved of his base assignments and become Wing S-2 in addition to his duties as Commanding Officer of Headquarters and Headquarters Squadron of the 7th Pursuit Wing.

Headquarters and Headquarters Squadron of the 4th Bombardment Wing, GHQ Air Force, is commanded by Major Daniel Irwin who, up until this time, has been the Commanding Officer of Headquarters and Headquarters Squadron of the 2nd Air Base Group. This Headquarters and Headquarters Squadron will be moved to Westover Field, Chicopee Falls, Mass., when the 4th Wing is activated.

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FLIGHTS BETWEEN PANAMA AND SOUTH AMERICA

A flight of two B-18 Bombers from France Field, under the command of Major William R. Sweeley, departed from Talara, Peru, on the morning of December 13, 1940, enroute to the Panama Canal Zone. Major Hector Minano, Sub-Director of the Peruvian Infantry School at Lima, Peru, was aboard as a passenger.

Members of the crew, in addition to Major Sweeley, were Captain Clarence M. Sartain and 2nd Lieut. Thomas R. Ford, Air Corps; 2nd Lieuts. Wm. L. Herblin, Paul D. Wood and Harold A. Bullock, Air Reserve; Master Sgt. Harry Glascock and Sgt. William Moroz, 25th Bombardment Squadron; Staff Sgts. Charles A. Johnson and Arthur L. Vietinghoff, of Hqrs. and Hqrs. Squadron, 6th Bombardment Group.

The flight had departed from the Canal Zone on December 9th for Lima, with an overnight stop scheduled at Quito, Ecuador. Two Peruvian Army officers returned to Lima as passengers - Captains Samuel Morante Jara and Louis Cayo Murillo.

The two B-18's arrived at France Field at 3:00 o'clock on the afternoon of December 13th. On board as passengers were Major Carlos A. Minano, Infantry, and Captain Victor Arce Manrique, Air Corps, of the Peruvian Army, who expect to remain in the Canal Zone some time as observers in order to inspect it and certain of its installations. Both of these officers have received an extensive background of military training, and their special capabilities have been recognized in Peru by their employment as instructors at Officers' Staff Schools. Major Minano is interested for his government in our application of military principles to all phases of the land, sea and air defense of the Panama Canal. Captain Manrique will be particularly concerned during his stay in analyzing the organization, operations, and equipment of all the various units of the Panama Air Force.

Three Bombardment planes of the 9th Bombardment Group, under the command of Captain Gerald E. Williams, returned to the Canal Zone from Quito, Ecuador, by the way of Guayaquil, at 5:30 p.m., December 18th. This courtesy flight, in commemoration of the Pan-American Aviation Day, had arrived in Quito at noon on Monday, the 16th.

About sixty prominent Ecuadorian officials were taken as passengers on local flights in the vicinity of Quito, including the Minister of National Defense, Minister of Navy, and various ranking Army and Navy officers.

The officers of the flight were entertained at a reception at the U.S. Legation on Monday evening, and were guests at an official ball, sponsored by the Ecuadorian Air Force, where they met the President of Ecuador, his cabinet, and ranking military and naval officers.

(Continued on Page 19)

FLYING TRAINING ACTIVITIES

SOUTHEAST AIR CORPS TRAINING CENTER

Advanced Flying School, Maxwell Field.

Colonel Floyd E. Galloway, Commandant of the Advanced Flying School, Maxwell Field, Ala., was recently advised by the Chief of the Air Corps than ten classes would be assigned to this unit of the Southeast Air Corps Training Center during 1941. The communication did not state how many students would be enrolled in each class, but made it known that, under present plans, classes would begin on January 4th, February 15th, March 22nd, May 3rd, June 7th, July 19th, August 23rd, October 4th, November 8th and December 20th. The present class at the Advanced Flying School includes two Regular Army officers and 102 Flying Cadets.

This class is now engaged on extended cross-country flights. The missions include Maxwell Field, with intermediate landings at Meridian and Birmingham, a distance of about 370 miles, requiring about 2 hours and 50 minutes; Maxwell Field to Tallahassee, Fla., and return, and Maxwell Field to Birmingham and Atlanta, and return.

Several of the 32 additional second lieutenants of the Air Reserve, who were ordered to Maxwell Field for duty as instructors, beginning January 2nd, arrived in Montgomery from Kelly Field. All were expected to arrive well before January 2nd to permit the school to begin training its second class.

The instructors are: 2nd Lieuts. Oscar R. Berney, Jr., McFate E. Beveridge, Luther C. Christman, George C. Darby, Jr., Clarence C. Fowler, Andrew F. Gordon, Wilmer A. Hardesty, Kenneth K. Howenstine, Hohn Koklus, Samuel R. McDaniell, Jr., Marion A. Miller, David J. Nolan, Richard L. Randolph, Robert A. Smith, Edward L. Van Allen, John W. Wright, Elman J. Beth, Frederick W. Caton, Virgil M. Cloyd, Jr., Alphens E. Forsman, Walter R. George, William L. Hall, William A. Herrmann, Frank G. Jones, Robert H. Larson, Wm. A. McWhorter, Dallas L. Morris, Stuart K. Oliver, Harold W. Richardson, John J. Surwiec, Rayford B. Whitley, Jr., and Lewis J. Wright.

The students entering the Advanced Flying School on January 2nd, following the completion of their Basic Flying Course at Montgomery Municipal Airport, include 41 student officers, graduates of the June, 1940, class at the U.S. Military Academy. Basic Flying School officials stated that this class of 164 students completed its work there eight days ahead of the original schedule.

Specialized Flying School, Selma, Ala.:

The transfer of about 700 officers and men from Maxwell Field to the Specialized Flying School at Selma, Ala., was begun on December 29th, and the movement was scheduled to be completed in several days. The men were transported by motor convoy.

Units moved to the Specialized School are the 90th and 92nd School Squadrons and the 67th Air Base Group, less the Second Materiel Squadron. Most of these men have been in training at Maxwell Field for the last few months.

Bombardier and Pursuit training will be given at the Air Corps Specialized Flying School at Selma, which is one of several large units under the jurisdiction of the Southeast Air Corps Training Center, Maxwell Field.

GULF COAST AIR CORPS TRAINING CENTER

Advanced Flying School, Kelly Field, Tex.

The largest class of Cadets to enter Kelly Field, Texas, in recent years, numbering 294, reported on December 23rd for advanced flying training. Also reporting with this class were 15 officers of the Regular Army, making the total number of students in the class 309.

The activities at Kelly Field were slowed down appreciably during the holidays. Many of the commissioned and enlisted personnel took advantage of leaves and furloughs to visit with their home folks. The Flying Cadets who graduated on December 20th were limited to travel distances of only one hundred miles from the field, and had to report in every day.

WEST COAST AIR CORPS TRAINING CENTER

Basic Flying School, Moffett Field, Calif.

Setting up a record never before duplicated by any class taking training at an Air Corps flying school, Class 41-B left a mark for successive classes to shoot at when its members left Moffett Field on January 1st for Stockton, Calif., to pursue their advanced training.

Of the 120 students originally reporting at Moffett Field, comprising 26 student officers and 94 Flying Cadets, only three men were eliminated - one student officer and one cadet for physical disability, and one cadet for lack of aptitude. Two members of the class were held over for a later class due to illness.

Only one minor accident marred the record of this unusual class, and this merely consisted of a damaged wing tip. There was not a single instance where a student or an instructor suffered in-

jury during the ten weeks the class was at Moffett Field.

According to Colonel E.B. Lyon, Commandant of the West Coast Air Corps Basic Flying School, the record is a tribute to the local field, as well as to the schools where the students received their primary instruction. Capt. T.J. Meyer, Director of Training, his staff of instructors on the faculty, and the crews of enlisted personnel who maintained the ships, were all commended by Colonel Lyon for their part in making the new record possible. Brigadier General Henry W. Harms, Commanding General of the West Coast Air Corps Training Center, also expressed himself as highly pleased with the record set by the class, which he described as exceptional in comparison with any previous class record.

During their ten weeks at Moffett Field, the group acquired approximately 7500 hours in the air; about 3400 hours dual time and the balance solo time. In addition to their flight training, the students completed more than 90 hours of classroom work, including meteorology, radio code, airplane engines, military law and radio communication, plus all of the infantry drill they must go through.

To broaden the scope of the pilot training program, and at the same time permit the training of a much larger number of men than at present, the establishment of six new training centers is planned, according to a statement recently made by Brigadier General Henry W. Harms, Commanding General of the West Coast Air Corps Training Center.

Recommendations have been made for sites for the schools, but no definite action has been taken as yet towards putting them into operation. The original announcement called for the establishment of three more civilian elementary flying schools; one more basic flying school, similar to the one at Moffett Field; one new two-engine advanced school and one new single-engine advanced school. In addition, the Stockton School is to be converted into a two-engine school. Mather Field, Sacramento, Calif., already the location of the Sacramento Air Depot, where major engine repairs are handled, will be the other two-engine school. A school for instruction in the art of flexible gunnery will also be set up as part of the training.

In place of the five weeks of training with the tactical units, as is the custom now, pilots who have completed their advanced work and have received their wings and commission will be given special work at the advanced schools. This is expected to cut down the special training time by one-half through the elimination of the transportation of the student from one school to another or to and from a tactical unit at some other field.

The addition of the three new civilian elementary flying schools will make a total of nine on the West Coast and, with the others added throughout the country, bring the nation's total to 29.

The establishment of the new two-engine schools has been made necessary by the advent of twin-motored Pursuit interceptors and other light two-engine planes, and has made necessary some training methods to acquaint pilots with the operation of multi-motored planes. In the past, only pilots with considerable time in the air have been turned into pilots for multi-motored planes.

Ryan School of Aeronautics.

The large Flying Cadet enrollment, starting January 4, 1941, will necessitate a considerable increse in the number of instructors, maintenance men and other civilian employees. At present, the instructional staff at the new branch pilot training school at Hemet, Calif., includes 32 pilots and 6 technical instructors. Many additional pilots are now in training, taking the advanced 25-hour instructors' course designed to bring them up to the standard required by Ryan and the Air Corps for flight instructors working on the cadet training program. Sixty-six maintenance and overhaul mechanics are now employed at Hemet, but this staff, too, will be augmented immediately.

Mr. R. Douglas Maw is the business manager at the Hemet School for Ryan, and Captain Lloyd P. Hopwood is Commanding Officer of the Air Corps Training Detachment.

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Pan-American Flights (From Page 17)

Personnel on the flight were, in addition to Captain Williams, Captain Byron E. Brugge, 1st Lieuts. Francis H. MacDuff, Harold J. Rau, Air Corps; 2nd Lieuts. Wm. E. Johnson, Jr., Donald K. Brandon, Peter Smally and Carl F.Walter, Air Res.; Tech. Sgts. Frank H. Lord, Earl A. Leger, Sgt. Oscar J. Nelson,1st Bombardment Squadron; Staff Sgt. Giles M. Putnam, Cpl. Robert L. Gehle, 99th Bombardment Squadron, and Pvt. 1st Cl. Svante B. Lijeroos, 5th Bombardment Squadron.

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Colonel Jacob W.S. Wuest, A.C., was relieved from duty at Langley Field,Va., and assigned to duty at Tallahassee,Fla.

20TH PURSUIT SQUADRON ARRIVES IN MANILA

At 4:00 p.m., October 30, 1940, the 20th Pursuit Squadron left Hamilton Field via truck convoy on the first leg of a journey to an unknown destination. The Squadron entrained at the Southern Pacific yards in San Francisco, and 30 minutes later was on the way to San Pedro.

The train arrived at the foot of the pier, where the S.S. WASHINGTON was docked, approximately at 8:00 p.m. We detrained at once and boarded the ship. The necessity of assigning quarters and seats in the dining salon delayed debarkation until 11:00 a.m. Once aboard the ship, troops were not permitted to go ashore without special permission. No one was allowed to leave the pier.

The ship sailed for Honolulu at 8:00 p.m., and the voyage was a quiet one, with fine weather every day. Troops passed the time playing quoits and shuffle-board, while officers amused themselves on the sun deck by engaging in deck tennis. We tied up at Honolulu at 6:30 a.m., November 5, 1940 and, after the ship was cleared of National Guardsmen, shore leaves were granted to all.

Members of the Squadron were aboard ship, ready to sail on the evening of November 7th, but we didn't put to sea until 6:00 a.m. the following day. We were headed for Shanghai.

Nine uneventful days followed and, with the exception of a few flying fish, a school of tuna, and a dozen or so of Booby terns, we saw no life. Due to the war, no ships were sighted until we were about a day out of Shanghai.

On that last day our waning interest was revived, for as we passed through the Southern Islands of Japan we sighted a few fishing boats and several rural steamers, of course, all Japanese.

The next morning we found ourselves in the murky waters of the Yantze River. Not long after picking up the pilot, we sighted shore, and by 11:00 a.m., we were steaming up the Whang Poo.

Evidence of human strife marked both banks of the river. Shattered buildings, concrete machine gun emplacements and Japanese soldiers afforded the proof.

We anchored about 12:30 p.m., still ignorant as to whether we'd be granted shore leave or not. Fortunately for us, it was, but unfortunately we were somewhat restricted due to the presence of the Japanese just outside the International Settlement.

At 3:00 p.m., November 19th, the 20th Pursuit Squadron, accompanied by 400 ex-missionary families, sailed for Manila. We disembarked at Manila the morning of November 23rd, after having traveled 28 miles by truck, 470 miles by train, and 10,031 miles by steamer.

- The Nichols News.

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17TH PURSUIT FOLLOWS 20TH TO PHILIPPINES

Officers and men comprising the 17th Pursuit Squadron, from Selfridge Field, Mich., arrived in Manila on the morning of December 5, 1940. This organization, commanded by Major Kirtley J. Gregg, A.C., was assigned to station at Nichols Field.

The Squadron arrived aboard the U.S. Army Transport ETOLIN, which was at one time the flagship of the Matson Line, and was originally christened the MATSONIA. For many years she was the Queen luxury liner of the Pacific. This was her first trip to Manila. During the World War she was one of the principal transports which took thousands of soldiers to France. Five years ago she was sold to the Alaskan Packing Association, only recently having been chartered by the Army as a transport. Before this trip she made an uneventful voyage to Alaska with troops and materiel.

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AIR CORPS OFFICERS LEARNING SPANISH

Learning to say it in Spanish was scheduled to become part of the duty of every commissioned Air Corps officer of the Advanced Flying School, Maxwell Field, Ala. On orders of the Commandant, Colonel Floyd E. Galloway, officers were expected to enroll at once and to attend one class a week. Arrangements were made to have a room in Austin Hall available for classwork each Monday and Friday at 7:30 p.m. Students are to be required to remain in the class until they became sufficiently proficient "to make themselves understood" or "to understand ordinary conversational Spanish."

Increasing relations with Spanish-speaking nations has made it desirable that Air Corps officers be able to master the rudiments of Spanish.

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Having 350 airplanes in the air at one time would give the average airport official a bad case of the jitters, but at Randolph Field, Texas, it is termed "routine." An average of seven landings and seven take-offs are made every minute of the day. Field officials estimate that the 850 Flying Cadets make 3400 landings and take-offs every day.

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V-8698, A.C.

CIVIC GROUPS PROVIDE RECREATION CENTER

Civilians of San Rafael, Calif., the closest town to the Hamilton Field air base, have long felt that some recreational facilities should be made available in their town to the soldiers on pass. Recent increments of recruits have made such an arrangement even more desirable, and the citizens, working in cooperation with the Chaplain and the Morale Officer of the post, took positive action on the long brewing plans. At a luncheon attended by civic and social leaders, a committee was appointed to find quarters for a recreational center in the city. Hamilton Field was represented by Brigadier General Millard F. Harmon, Post Commander, and Major Walter C. White, Morale Officer, both of whom spoke briefly and expressed their appreciation of the efforts of the civilians to provide the much needed facilities for the enlisted men.

Less than a week after the committee was appointed, a large building had been found and work was started to install furniture, games, reading matter and other equipment. A formal opening was planned ten days after the first meeting of the committee, and was attended by a large group of civic leaders, officers of the post, and approximately 100 enlisted men, who arrived in Army trucks eager for the festivities. They were not disappointed, as a plentiful supply of refreshments was on hand, and they were greeted by a speech of welcome by the committee chairman.

The opening, attended by the press and well publicized, was declared a great success, and personnel of the base are looking forward with a great deal of pleasure to having a convenient advanced command post in town while on pass. All concerned have agreed that this step has done more to insure friendly, cordial relations between the soldiers and civilians than anything else that has been done since the establishment of the post in 1932.

Dances, athletic events, and various social activities are being planned in order to permit soldiers to form social contacts in town, and arrangements were made during the Christmas holidays to invite a number of enlisted men to San Rafael homes.

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NUCLEUS OF NEW ORGANIZATIONS FROM 2ND BOMBARDMENT GROUP PERSONNEL.

Once again the 2nd Bombardment Group, Langley Field, Va., is undergoing a "split up," akin to that of February, 1940, when there were formed from this Group the 25th and 29th Bombardment Groups and the 41st Reconnaissance Squadron. The organizations being formed this time will be the 34th and 43rd Bombardment Groups, located at Westover Field, Chicopee Falls, Mass., and Bangor, Maine, respectively.

Some threnodial comments have already been heard concerning the prospective loss of experienced and noteworthy personnel. On December 5th, the following-named officers were transferred to the 22nd Bombardment Group: Captains Hoyt L. Prindle, David P. Laubach, Ralph E. Koon, William L. Lee, Millard L. Haskin, Irving R. Selby, 1st Lieuts. Arthur Y. Snell, William A. Garnett, Raymond T. Petersen, Otto B. McIver, George R. Anderson, Hugh B. Manson, Roger E. Phelan, 2nd Lieuts. Waldemer L. Hawkins, Walter P. Maiersperger, Charles A. Martin, William W. Ottinger, William J. Headrick, Craig E. Walling, Winfred O. Craft, John E. Fitzgerald. These officers are a fine addition to the 22nd Group, but to the 2nd Bombardment Group they are almost an irreplaceable loss.

On December 13th, another order was issued listing the officers transferred to form the cadres of the now embryonic organizations - the 34th and 43rd Bombardment Groups (H), the 38th Bombardment Group (M), and the 1st Reconnaissance Squadron (H), viz:

To the 34th Bombardment Group: Majors John W. Monahan, Robert B. Williams, Captains Ford J. Lauer, Torgils G. Wold, John R. Sutherland, and 2nd Lieut. Warren S. Wheeler;

43rd Bombardment Group: Major Harold D. Smith, Captains Howard Moore, John G. Fowler, 2nd Lieuts. Theodore R. Clinkscales, Louis A. Almeida and Joe G. Gillespie, Jr.

38th Bombardment Group: Major Herbert K. Baisley.

1st Reconnaissance Squadron: Captain William A. Matheny.

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ENLISTED MEN FORM FLYING CLUB

Staff Sergeant Earle Powers has organized a flying club amongst the personnel of the 22nd Pursuit Squadron (Interceptor), Langley Field, Va. The members of this club are Tech. Sgt. Arthur Vichert, Staff Sgt. Frank Castelitz, Sgts. H.R. Robinson, J.C. Knight, K.G. Hawk. These men own their Taylor "Cub" plane and carry on their flying activities during after duty hours and on Sundays. Sergeant Powers, who is the flying instructor, has over 800 hours to his credit, and most of his students are ready to solo. They perform their own engine maintenance. Flying is done from Newport News Airport.

RADIO BROADCASTS

Langley Field got its turn at the microphone of the Blue Network series of national broadcasts on "Life in the Army" on December 27th, and the amateur talent among the thousands who wear the wings of the Army Air Corps at this air base staged a sort of theatrical tug-of-war for coveted position on the program in the Base Chapel on Friday evening, December 20th, at 7:00 o'clock.

The trick one-man orchestras, the corny tooters, the lilting yodlers and the imitators and all their vaudevillean brothers and cousins paraded before the Langley Field and NBC talent scouts and judges a week before the broadcast in the crowded little chapel, in the hope that they might gain even a fleeting moment on the national hook-up from the Langley air center.

The series, which started December 20th at the big Infantry camp at Fort Dix, N.J., is intended to bring the home folks in intimate touch with their boys in the huge Army centers throughout the nation. Langley Field, with its teeming thousands of young men, had second spot on the schedule, which extends until March 14th, when the broadcast will be from Fort Lewis, Wash.

The audition on December 20th was open to the air base personnel without reservation. The process was to select a nicely varied list of events balanced so that some purely informative items about the air base and its functioning was sandwiched into the 30-minute program, and the audition lasted more than an hour.

Recreation authorities of Langley Field, who with the senior chaplain, Captain Charles I. Carpenter, were charged with scouting up the talent, reported a large response.

Among the talent and technical personnel of NBC who were on the field to direct the broadcast on the 27th from the NBC mobile broadcasting station was Lester O'Keefe, crack program director of Radio City, New York. Jeff Baker, announcer for WTAR, Norfolk, presided over the audition scramble of local talent and at the mike during the actual broadcast. Also present for the hook-up date were Don Whittemore and Jon Larson, NBC engineers, and Thomas Webber and Arthur Donnegan, press representatives of NBC. These technicians were on the field to take part in the broadcast on Christmas day.

A group of over 300 officers, their families and friends enjoyed the Vox Pop program from the Officers' Club at Mitchel Field, N.Y., on Thursday evening, January 9, 1941. The officers who appeared on the program were Colonel Edward M. Morris, Captain Charles W. Stark, Lieuts. Mark E. Hubbard, Rush H. Willard, Robert N. Thayer and Max McNeil. From Colonel Morris on down, the boys all performed like veterans and, from all reports, the show was a real success.

All the officers did well enough to get themselves some nice new crisp one dollar bills, and Lieut. Thayer, by guessing closest to the number of cabinet members President Roosevelt has had since his inauguration, was awarded the grand prize of ten dollars. An additional prize of five dollars was offered for the contestant who could throw a toothpick the greatest distance. Captain Stark walked off with this prize by tossing the timber a total distance of 16 feet to establish a new "World's Record" for toothpick tossing.

After the broadcast, the announcers Parks Johnson and Wally Butterworth had an informal quiz for members of the audience, and James McNaughton, known as "Pottle" of radio fame, entertained with a few stories.

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MAXWELL FIELD ENLISTED MEN IN TRAINING FOR SERVICE IN PANAMA.

A temporary reduction of 600 Air Corps personnel at Maxwell Field, Ala., was recently effected by a War Department order transferring them to technical schools at Jefferson Barracks, Mo., prior to their assignment to duty in the Canal Zone.

These enlisted men in three approximately equal contingents left Maxwell Field on successive days, traveling by rail. The first contingent was under the command of 2nd Lieut. E.B. Bates, Cavalry Res.; the second, under Lieut. Major T. Martin, Field Artillery Res., and the third under Lieut. Colon S. Auvil, Inf. Res.

In addition to the officers in charge, each contingent was accompanied by four noncommissioned officers.

The technical schools are conducted by the Army to qualify its personnel as experts in the various technical and mechanical activities essential to military operations.

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The News Letter extends its appreciation to Mr. Henry Clark, who designed the cover featuring this issue. Mr. Clark, who is connected with the Craft Art Co., New York City, has produced cover designs for previous issues of the News Letter, and it is hoped to hear from him again in the near future.

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FLYING CADET GRADUATES: CLASS 40-H, FROM KELLY FIELD, TEXAS

The following-named Flying Cadets, 270 in number, graduated from the Air Corps Advanced Flying School, Kelly Field, Texas, on December 20, 1940, on which date they received their "Wings" and their commissions as second lieutenants in the Air Reserve:

Lanford, Spears Randall	Anniston, Ala.
Alexander, Joe Elden	Berry, Ala.
Jackson, Eugene Randolph	Decatur, Ala.
Mason, Reginald Hoyt	Eclectic, Ala.
Turner, Ernest	Florala, Ala.
Granberry, John M., Jr.	Montgomery, Ala.
DeBriere, Sidney Louis	Tuscaloosa, Ala.
Underwood, George William, Jr.	Uniontown, Ala.
Merrill, Keith Nelson	Safford, Ariz.
Pierce, James Robert, Jr.	Ashdown, Ark.
Latourette, Harry Hewes	Jonesboro, Ark.
Morgan, Howard Whitfield	Monticello, Ark.
Pureta, Frank John, Jr.	Berkeley, Calif.
Ireland, Frederick Robert	Casmalia, Calif.
Martens, Robert Charles	Claremont, Calif.
Huffman, Orland Glenn	El Cajon, Calif.
Fleming, Thomas Beck	Glendale, Calif.
Tavasti, Roy Emil	Glendale, Calif.
Pfeiffer, George, Jr.	Los Angeles, Calif.
Work, John Harper	Long Beach, Calif.
McGarry, William Doyle	Los Angeles, Calif.
McLaughlin, Fred Joseph	Los Angeles, Calif.
Miller, Paul Burwell	Los Angeles, Calif.
Stoecker, Howard A.	Los Angeles, Calif.
Haney, George William	March Field, Calif.
Dempster, Kenneth C.	Oakland, Calif.
Bachrach, Robert Irving	Oceanside, Calif.
Catton, Jack Joseph	Pacific Palisades, Calif.
Conradi, Arthur, Jr.	Piedmont, Calif.
Martensen, John Keith	Pomona, Calif.
Shea, John Henry	Riverside, Calif.
Hayes, James Frederick	Sacramento, Calif.
Hayes, Jack William, Jr.	San Diego, Calif.
Parker, Ben LaRue	San Diego, Calif.
Gould, Robert A., Jr.	San Jose, Calif.
Piper, Preston	Santa Ana, Calif.
Garland, William James	San Pedro, Calif.
Stevenson, Herbert L.	Valley Springs, Calif.
Whidden, Jack Davis	Van Nuys, Calif.
Kimsey, William Lyle	Denver, Colo.
Reddington, William Morris	Denver, Colo.
Anlbin, Fred Einar	Bridgeport, Conn.
Carroll, Thomas Leonard	West Hartford, Conn.
Olsson, John S.	Woodbridge, Conn.
Gilbert, Roy	Fort Myers, Fla.
Whiddon, David Trubert	Sneads, Fla.
Clinkscales, Robert Stewart	Atlanta, Ga.
Lanford, Horace Whaley	Atlanta, Ga.
O'Donnell, Anthony Joseph, Jr.	Atlanta, Ga.
Wilson, Leon Portlock, Jr.	Atlanta, Ga.
Moss, Robert Charles	Doerun, Ga.
Millar, John Robert, Jr.	Marietta, Ga.
Smith, Walter Anthony, Jr.	Savannah, Ga.
Myers, Graves Trenholm, III	Summerville, Ga.
Moeller, Berthold August, Jr.	Honolulu, T.H.
Allen, Barnett Stanford	Grace, Idaho
Witherspoon, William Lewis	Nampa, Idaho
Plourd, Webster William	Brookfield, Ill.
Brock, Richard Crawford	Chicago, Ill.
Monaco, John, Jr.	Chicago, Ill.
Valorz, Edward Henry	Chicago, Ill.
Waskowitz, Frank Thomas	Chicago, Ill.
Gravenhorst, Edward Henry	Effingham, Ill.
Kinsley, Rexford Raymond	Evanston, Ill.
Weaver, James Howard	Freeport, Ill.
Yengst, Craig McClure	Galesburg, Ill.
Frank, Willis Turner	Jacksonville, Ill.
Wynemiller, Price Perry	Napersville, Ill.
Stephens, Robert Glenn	Oak Park, Ill.
Thompson, Donald McLean	Oak Park, Ill.
Pixley, Jerald Elwyn	Ottawa, Ill.
Schinz, Albert William	Ottawa, Ill.
Welsh, Russell J.J.	Ottawa, Ill.
Allison, Robert S.	Quincy, Ill.
Morris, John Joseph	Oaklandon, Ill.
Seitzinger, Bernard K.	Brighton, Iowa
Benesh, Robert Horace	Cedar Rapids, Iowa
Knight, James Wesley	Council Bluffs, Iowa
Brereton, James Knoweles	Emmetsburg, Iowa
Irvin, Robert Bigelow	Estherville, Iowa
Krebs, Lawrence Francis	Fonda, Iowa
McDonald, Everett Arthur	Iowa City, Iowa
Dusenbury, James Albert	Anthony, Kans.
Allard, Charles Arthur	Arkansas City, Kans.
Burton, John Clement	Arkansas City, Kans.
Anderson, Jack Pershing	Hutchinson, Kans.
McCowan, Morgan Samuel	Leoti, Kans.
Hoss, Jerome Harley	Ness City, Kans.
Callahan, Eugene Haile	Wichita, Kans.
Kaiser, George Edward	Somerset, Ky.
Vose, Marshall Thompson	Farmington, Maine
Berryman, William Connor	Boston, Mass.
Newcombe, William Hervey	Fitchburg, Mass.
Crane, Vincent Mercer	Manchester, Mass.
Curtis, Frank Mitchell, Jr.	Milton, Mass.
Cowdery, Burnham Webster	Needham, Mass.
Dacey, Timothy John, Jr.	Newton, Mass.
Schreiber, Leroy Adolph	Plymouth, Mass.
Bird, John Russell	Reading, Mass.
Handy, William John	Springfield, Mass.
Hockenberry, Frank Clayton	Springfield, Mass.
Power, Walter Stanley	Waltham, Mass.
Stralser, Bernard Joffa	Detroit, Mich.
Waite, Arthur Ernie	Detroit, Mich.
Gilmore, Edwin Bruce	Highland Park, Mich.
Chapel, Ralph Helmer	Jackson, Mich.
Richmond, Manley Osborn	Marshall, Mich.
Neal, Robert William	Muskegon, Mich.
Hanson, Bertil Everett	Baudette, Minn.
Messenger, Lester Charles	Minneapolis, Minn.
Halbert, Hugh Tyler	St. Paul, Minn.
Cunningham, John Borders, Jr	Deerbrook, Miss.
Stewart, William Sullivan	Picayune, Miss.
Tadlock, Walter Derward	Raleigh, Miss.
Swindle, Estes Trigg, Jr.	Shaw, Miss.
Mitchem, Kelly Word	Tunica, Miss.
Stapleton, John Robert	Tunica, Miss.
Chandler, Louis Dagenhardt	West Point, Miss.
Reissaus, Charles Adolph	Cape Girardeau, Mo.
Henggeler, Francis Joseph	Clyde, Mo.
Doss, Edwin Allen	Desloge, Mo.
Avery, Albert James, Jr.	Kimmswick, Mo.
Ward, Charles Carroll	Rolla, Mo.
Porter, John William	St. Louis, Mo.
Schwindler, John David, Jr.	Sturgeon, Mo.
Van Haur, James Philip	Missoula, Mont.
Hohenstein, William Nels	Jackson, Nebr.
Etchemendy, John Michael	Gardnersville, Nevada
Cobeaga, Mitchell Antone	Lovelock, Nevada
Parsons, William Albert	Reno, Nevada
Wikstrom, Floyd Edward	Reno, Nevada
Kinkel, Donald Elmer	Sparks, Nevada
Beck, Howard Alfred	Livingston, N.J.

Fluharty, James Whitely	Penn's Grove, N.J.
Ortega, Joseph Alcorio	Albuquerque, N.M.
Shaefer, Robert W. Rowland	Capitan, N.M.
Davis, William Osborne	Bronx, N.Y.
Clark, Carlton Howard	Eden, N.Y.
Kahan, Moe	Flushing, N.Y.
Sharp, Frank Allen	Hamburg, N.Y.
Malone, Booth Golasmith	Manhasset, N.Y.
Perna, Antonny Joseph	Mineola, N.Y.
Ansley, Frank Abendroth	Niagara Falls, N.Y.
Smith, Robert Harry	Oneida, N.Y.
Mead, Bruce Sloat	Roxbury, N.Y.
Krieger, Andrew Edward, Jr.	Salamanca, N.Y.
Connelly, Martin Redmond	Syracuse, N.Y.
Mesita, James Vincent	Syracuse, N.Y.
Thomson, Archibald Millard, Jr.	Walton, N.Y.
Hartbrodt, Fred Alex Vincent	Woodside, N.Y.
Allen, Claude Wisler	Sanford, N.C.
Edwards, Charles Graham	Wilmington, N.C.
Friedman, Morris Nathan	Grand Forks, N.D.
Theodos, Gus Dean	Rugby, N.D.
Sather, Harley [illegible]	Ryder, N.D.
Steele, Donald Dale	Akron, Ohio
Newtauer, John Alvin	Bradford, Ohio
Griffith, John Graham	Cincinnati , Ohio
Levine, Robert	Columbus, Ohio
Raudebaugh, Thomas Corwin	Dayton, Ohio
Reese, William Griffith, Jr.	Grafton, Ohio
Hamilton, Harry Core	Toledo, Ohio
Dale, Jack Dellmer	Willoughby, Ohio
Obert, David Louis	Apache, Okla.
Stockett, Marvin Mac	Bethany, Okla.
Smith, Robert E.	Cooperton, Okla.
Albright, Clay	El Reno, Okla.
Thompson, Francis Reuben	El Reno, Okla.
Rice, Lewis Douglas	Frederick, Okla.
Burke, Archie Maurice	Grandfield, Okla.
Stanton, Carroll Lane	Jenks, Okla.
Culbertson, Kline Downing	Kingfisher, Okla.
Jones, John Egbert	Lawton, Okla.
Kelley, Wendell James	Lexington, Okla.
Minor, John Warren, Jr.	Norman, Okla.
Lackey, John Woodrow	Oklahoma City, Okla.
Ballard, Carl Van	Pauls Valley, Okla.
Blanton, Nathaniel Hayne	Shawnee, Okla.
Levee, Douglas Bowen	Stillwater, Okla.
Walker, Foster Lanthe	Stringtown, Okla.
Bowlin, Paul Foret	Tulsa, Okla.
Jannsen, Edward Martin	Beaverton, Ore.
Smith, Paul B.	Corvallis, Ore.
Thorsen, James G.	Corvallis, Ore.
Bailey, Bryson Robert	Forest Grove, Ore.
Madison, Robert Max	Grand Ronde, Ore.
Hutchinson, Thomas Dale	Helis, Ore.
Busch, Keith Nelson	Hillsboro, Ore.
Patton, Clifford Porter	Junction City, Ore.
Benson, Noel Stephen	McMinnville, Ore.
Williams, Richard Lane	Milwaukie, Ore.
Parsons, Lewis Francis	Multnomah, Ore.
Goodyear, Elvin Earl	Pendleton, Ore.
Ingenhutt, William Weeks	Powers, Ore.
Bonebrake, Robert Raymond	Roseburg, Ore.
Holzappel, Jerald Floyd	The Dalles, Ore.
Ellstrom, George Oliver	Bethlehem, Pa.
Long, Robert Milton	Connellsville, Pa.
Long, Richard Norton	Connellsville, Pa.
Bell, John Howard	Lewistown, Pa.
Kruzel, Joseph John	Wilkes-Barre, Pa.
Beile, Robert Lewis, Jr.	Charleston, S.C.
Dendy, Julian, Jr.	Columbia, S.C.
Priester, Norman Eugene, Jr.	Columbia, S.C.
Townsend, John Clarence, Jr.	Columbia, S.C.
Long, Langdon Dwight	Laurens, S.C.
Clark, Jack Cameron	Mt. Pleasant, S.C.
Scott, Ray Lester	Elk Point, S.D.
Taylor, William Harrison	Rapid City, S.D.
Olson, Clifford Butryx	White River, S.D.
Evans, William Stewart	Knoxville, Tenn.
Allen, Wilbur Clinton, Jr.	Memphis, Tenn.
Williamson, Jay Anderson	Brownwood, Texas
Washburn, Walter Raleigh, Jr.	Cleburne, Texas
Duncan, Robert P.	Dallas, Texas
Hoover, Robert	Dallas, Texas
Lillard, James Warren	Dallas, Texas
Wagner, Furlo Swift	Fort Worth, Texas
Denson, Harvey Thomas, Jr.	Grander, Texas
Swenson, Edward	Manor, Texas
Winburn, Thomas Howard	Rockport, Texas
Anderson, Irvin George	San Antonio, Texas
Frost, John, II	San Antonio, Texas
Garrison, Eskelle Victor	San Antonio, Texas
Steedman, Edward Adolph	Sherman, Texas
Moore, Wilson	Texarkana, Texas
Garland, Ben Allen	Waco, Texas
Hale, Zefyra Idus	Abilene, Texas
Wahlstrom, Norman Clivor	Lakotown, Utah
McClie, Richard Douglas, Jr.	Salt Lake City, Utah
Peterson, Ray	Salt Lake City, Utah
Hatch, Horace Eldriedge	Woods Cross, Utah
Peaslee, Jesse Clair	Chelan, Wash.
Haney, Otto Reed	Lyons, Wash.
Felton, George Boyd	Malden, Wash.
Ludwig, Richard Herbert	Seattle, Wash.
Storkan, Donald Keith	Seattle, Wash.
Voelimeck, Joseph Wilburn, Jr.	Seattle, Wash.
Womaser, Vincent James	Seattle, Wash.
Moore, Henry Clay, Jr.	Spokane, Wash.
Potter, Russell Albert	Spokane, Wash.
Swannack, George Ernest, Jr.	Spokane, Wash.
Campbell, Frederick Densmore	Tacoma, Wash.
Earis, Gordon Invern	Tacoma, Wash.
Robins, Donald D.	Woodland, Wash.
Garrett, Paul Cather	Martinsburg, W.Va.
Duganne, John Andrews	Altoona, Wisc.
Loehrke, John Edward	Mayville, Wisc.
Morcom, Donald John	Milwaukee, Wisc.
Frantz, Henry Donald	Neillsville, Wisc.
Gross, Clarence Henry	South Range, Wisc.
Spring, Donald Harry	Wauwatosa, Wisc.
Bower, Roger Donald	Worland, Wyo.

The State of California, as is almost invariably the rule, leads all the States in the matter of representation of students in the graduating class, being credited with 27 residents of that State, followed by Illinois and Oklahoma with 18 each; Texas, 16; Oregon, 15; New York, 14; Washington, 13; Massachussetts, 11; Alabama, Ohio and Georgia, 8 each; Iowa, Kansas, Mississippi, and Missouri, 7 each; Michigan, South Carolina and Wisconsin, 6 each; Nevada and Pennsylvania, 5 each. None of the other States is represented by more than four students each.

Los Angeles, Calif., leads the cities represented with 5 graduates, followed by Atlanta, Ga., Chicago, Ill., and Seattle, Wash., with 4 each; Ottawa, Ill.; Columbia, S.C.; Dallas and San Antonio, Texas, and Spokane, Wash., 3 each. None of the other cities in the country is represented by more than two students each.

The graduates of the Gulf Coast Air Corps Training Center, as listed above, were recently assigned to extended active duty, under their status as second lieutenants of the Air Reserve at various Air Corps stations.